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April 1998



Rangeland Health Standards and Guidelines for California and Northwestern Nevada Final EIS

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT

California State Office
2135 Butano Drive
Sacramento, CA 95825-0451

April 1998

Dear BLM Stakeholder:

The Bureau of Land Management is pleased to make available the final Environmental Impact Statement (FEIS) analyzing alternative approaches in the identification and implementation of Standards for Healthy Rangelands and Guidelines for Livestock Grazing on public rangelands in California and Northwestern Nevada.

This FEIS reflects substantial input by the public who commented from review of the draft EIS during 1997, and further analysis of new information. The BLM staff consulted with the Bureau's California Resource Advisory Councils in developing the preferred alternative. Citizens serving on our advisory councils expended considerable time and effort developing the recommendations presented here. Their diligence in this effort and their concern for the health of the public lands are commendable. The preferred alternative portrays our proposed standards and guidelines designed to provide a framework in which BLM and its stakeholders can cooperate to assure that our rangelands are healthy and productive for today's citizens and future generations. We believe that these standards and guidelines will enable us to achieve a balance of sustainable development and multiple use, and progress toward maintaining or attaining healthy, properly functioning rangelands.

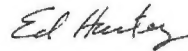
This document will also amend 19 existing land use plans in California and portions of Northwestern Nevada. The proposed plan amendments may be protested only by parties who participated in the planning and analysis process and may only protest issues that had been previously raised on the draft EIS. Protests must be sent to the Director (210), Bureau of Land Management, Attention: Brenda Williams, 1849 C Street, N.W., Washington D. C. 20240. Protests must be postmarked within 30 days after the Environmental Protection Agency publishes its notice of receipt of the final EIS in the Federal Register. Protests must minimally contain the following information.

1. The name, mailing address, telephone number, and interest of the person filing the protest.
2. A statement of the issue or issues being protested.
3. A statement of the part or parts being protested. Cite pages, paragraphs, maps, etc. of the proposed action where practical.

4. A copy of all documents addressing the issue(s) that you submitted during the draft EIS process, or a reference to the date when you discussed the issue(s) for the record.
5. A concise statement why you believe the BLM State Director's proposed action is incorrect.

At the end of the 30-day protest period, the proposed action, excluding any portion under protest will become final. A Record of Decision will be issued for the non-protested portions of the proposal, amending land use plans. Approval will be withheld on any portion of the proposal under protest until a final action has been completed on such protest.

Sincerely,



Ed Hastey
State Director

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STANDARDS

for Rangeland Health

and

GUIDELINES

for Livestock Grazing Management

on BLM-Administered Lands
in California and Northwestern Nevada

FINAL Environmental Impact Statement

Prepared by the Bureau of Land Management
California State Office
April 1998

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ABSTRACT

Standards for Rangeland Health and Guidelines for Livestock Grazing Management in California and NW Nevada

Environmental Impact Statement

Draft () Final (X)

United States Department of the Interior, Bureau of Land Management (BLM)

1. Type of Action: Administrative (X) Legislative ()

2. Abstract: This environmental impact statement (EIS) documents the effects of adopting regional standards for rangeland health and guidelines for livestock grazing management on BLM-administered lands in parts of California and NW Nevada. The Preferred Alternative described in the final EIS (Alternative 5) is the Proposed Action analyzed in the draft EIS (Alternative 1) with changes set forth in this document. The changes reflected in the Preferred Alternative are within the scope and analysis of the draft EIS, and do not alter the analysis of the environmental consequences. The changes reflected in the Preferred Alternative are a result of public comment and input from the three Resource Advisory Councils (RACs). Five alternatives are considered in the final EIS: The original RAC recommendations for regional standards and guidelines; the state-wide standards and regional guidelines; the fall-back standards and guidelines from the regulations; rapid improvement standards and guidelines; and a modified set of regional standards and guidelines.

This document contains most of the original draft EIS, with changes and corrections. It includes the following:

- a statement of the purpose and need for the action,
- a description of the alternatives, including the preferred alternative,
- a description of the affected environment,
- an analysis of environmental consequences,
- an analysis and response to public comments on the draft EIS, and
- other sections required by the Council on Environmental Quality regulations.

3. For further information contact:

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SUMMARY

This is the Final Environmental Impact Statement for developing Rangeland Health Standards and Livestock Grazing Management Guidelines. The EIS describes the environmental impacts that would result from a number of alternatives for managing BLM-administered rangelands, including the actual proposed standards and guidelines for California and NW Nevada. This EIS was written to analyze a range of reasonable alternatives and to present the results of the environmental analysis in a form that can best inform the public and serve the need of the decision maker.

The final EIS was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA). It is combined with and incorporates the draft EIS. The Preferred Alternative described in the final EIS (Alternative 5) is the Proposed Action analyzed in the draft EIS (Alternative 1) with changes based upon information and suggestions raised through public comment, Resource Advisory Council (RAC) input, and internal review.

Of the 649 allotments in the EIS area, 387 allotments are currently meeting the standards or making significant progress toward meeting the standards with current management practices.

59 Allotments were identified as being in Category 1 -- areas where one or more standards are not being met, or significant progress is not being made toward meeting the standard(s), and livestock grazing is a significant contributor to the problem. Some form of livestock management change will be made in those allotments, based upon site-specific needs. Appendix 21 contains a detailed listing of these allotments.

The most common types of change expected are in grazing systems and season of use, but there will also be some reductions in use and exclusions of portions of allotments from livestock use. A net reduction of approximately 12,000 livestock AUMs (about 3.5% of a total of 338,715 within the study area) is projected as a direct result of standard and guideline implementation.

190 allotments are in Category 3 -- areas where the status for one or more standards is not known, or the cause of the failure to meet the standard(s) is not known. These will be reviewed on a priority basis, as described in Appendix 21.

There were an additional 13 allotments in Category 4 -- areas where one or more standards are not being met due to some other resource use or problem than grazing. As priorities and funding allow, the authorized officers will take appropriate action based on regulation or policy to correct these situations.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

This environmental impact statement (EIS) is to develop standards for rangeland health and guidelines for grazing administration on public lands managed by the California State Office of the Bureau of Land Management (BLM), exclusive of the California Desert District; and to incorporate those standards and guidelines into existing land use plans. The affected area includes approximately 5.7 million acres of public land in California and northwestern Nevada, of which about 4.4 million acres are grazed. The locations of these public land areas are shown on Map 1.

In 1934, Congress passed the Taylor Grazing Act, directing that the occupancy and use of public rangelands be regulated to preserve the land and its resources from destruction or unnecessary injury, and to provide for the orderly use, improvement, and development of the range. Since passage of the Taylor Grazing Act, several studies and reports to Congress have identified continued problems on the western rangelands. In 1978, Congress enacted the Public Rangelands Improvement Act (PRIA), and included the following findings in their report:

- (a) Rangelands were still producing below their potential;
- (b) Rangelands would remain in unsatisfactory condition or decline even further under the current levels of funding and management; and
- (c) The unsatisfactory condition of public rangelands presented a high risk for soil loss, siltation, desertification, water loss, loss of wildlife and fish habitats, loss of forage for livestock and other grazing animals, degradation of water quality, flood danger, and threats to local economies.

Since passage of PRIA, conditions on most upland areas have improved, but many riparian areas continue to be degraded and are not functioning properly.

In 1991, the Director of the Bureau of Land Management asked the agency's National Public Lands Advisory Council to recommend ways to improve BLM's rangeland management program. The council chartered a blue-ribbon panel of professional ecologists and rangeland managers, who produced a report entitled Rangeland-Program Initiatives and Strategies. In the report, they concluded that BLM's main objectives should be to protect the basic components of rangelands -- soil, water, and vegetation -- and that management goals should be based on modern ecological concepts.

In 1993, the BLM initiated a new effort, now known as "Rangeland Reform 94," to better enhance the environmental health of public rangelands. This initiative was aided by the publication in January 1994 of a report entitled Rangeland Health: New Methods to Classify, Inventory and Monitor Rangelands. The report, published by the Committee on Rangeland Classification, Board of Agriculture, of the National Research Council (whose members are drawn from the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine), contained clearly stated explanations of what rangeland health is, as well as criteria and indicators of rangeland health. It also discussed current assessment practices, and inventory and monitoring needs.

The "Rangeland Reform 94" initiative, through public involvement and a national EIS, provided the direction for BLM to carry out a rangeland management program that improves ecological conditions, while providing for sustainable development on the land. To support this management direction, in 1995, the Secretary of the Interior developed new grazing regulations to implement needed changes in BLM's rangeland management program.

1.2 PURPOSE AND NEED

As a result of the "Rangeland Reform 94" effort, the Secretary of the Interior issued a final rule for Grazing Administration, on February 22, 1995, that became effective August 21, 1995. Section 4180.2 of this rule required the BLM State Directors to develop state or regional standards and guidelines for grazing administration in consultation with BLM Resource Advisory Councils (RACs), other agencies, and the public. The purpose of the standards and guidelines is indicated by the following quotations from the Federal Register, Vol. 60, No. 35, page 9956, dated February 22, 1995:

The guiding principles for standards and guidelines require that State or regional standards and guidelines address the basic components of healthy rangelands.

The Department intends that the standards and guidelines will result in a balance of sustainable development and multiple use along with progress towards attaining healthy, properly functioning rangelands.

The Department believes that by implementing grazing-related actions that are consistent with the fundamentals of Subpart 4180.1 and the guiding principles of Subpart 4180.2, the long-term health of public rangelands can be ensured.

1.3 FUNDAMENTALS OF RANGELAND HEALTH

The National Research Council, in its report, defines rangeland health as ". . . the degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained," referring in particular to those "ecological processes that are most important in sustaining the capacity of rangeland to satisfy values and produce commodities" (Natural Resource Council 1994, pp. 4 and 5). This committee recommended that "the determination of whether a rangeland is healthy, at risk, or unhealthy should be based on the evaluation of three criteria: degree of soil stability and watershed function, integrity of nutrient cycles and energy flow, and presence of functioning recovery mechanisms" (ibid., pp. 97-98). If rangeland health is conserved, then the capacity of the site to produce different mixes of commodities and values is conserved (ibid., pg. 95). A "Rangeland Health Evaluation Matrix," as developed by the National Research Council (ibid., pg 130 & 131) is reproduced in Appendix 1 .

Section 4180.1 of the Grazing Administration Regulations (4180.1, Federal Register Vol. 60, No. 35, pg. 9970) directs that the authorized officer ensure that the following conditions of rangeland health exist:

- (a) Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage,

and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity, and the timing and duration of flow.

- (b) Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.
- (c) Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM management objectives such as meeting wildlife needs.
- (d) Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal Candidate and other special status species.

Conditions (a) and (b) describe physical and biological characteristics of health rangelands. Conditions (c) and (d) describe healthy rangelands in terms of legal requirements that will be met when rangelands are properly functioning.

1.4 STANDARDS AND GUIDELINES -- BASIC CONCEPTS

"The fundamentals of rangeland health, guiding principles for standards and the fallback standards address ecological components that are affected by all uses of public rangelands, not just livestock grazing. However, the scope of this final rule, and therefore the fundamental of rangeland health of part 4180.1, and the standards and guidelines to be made effective under part 4180.2, are limited to grazing administration" (Federal Register, Vol. 60, No. 35, pg. 9970-9971).

The following are characteristics of standards and guidelines.

A Standard:

- (1) is a criterion regarding a resource quality or quantity upon which a judgement or decision is based (e.g., a statement concerning expected ecosystem or rangeland health);
- (2) is measurable;
- (3) establishes parameters within which resource use and management activities can be conducted; and
- (4) should have observable indicators.

A Guideline:

- (1) describes a practice, method or technique used to ensure that grazing management activities meet standards;
- (2) is either a set of management practices from which one or more practices is selected; or is a specific, required management practice;
- (3) may be adapted or changed when monitoring or other information indicates the guidelines are not effective or a better means of meeting applicable standards exists.

There have been questions about using Desired Plant Communities (DPCs) as standards. DPCs are vegetative communities that are designated through land use plans as the vegetative communities necessary to achieve the goals of the land use plan. A DPC would not be a standard; in order to achieve a DPC, the rangeland would need to be healthy and meeting the standards.

1.5 PROCESS FOR ESTABLISHING STANDARDS AND GUIDELINES

Another result of "Rangeland Reform 94" and the rulemaking by the Secretary of the Interior was the formation of Resource Advisory Councils (RACs) (Federal Register, Vol. 60 No. 35, February 22, 1995). The primary purpose of the RACs is to advise BLM regarding the preparation, amendment and implementation of land use plans. In addition the State Directors are to consult the RACs regarding the development of the standards and guidelines and to identify the geographic area for which the standards and guidelines are developed (43 CFR 4180.2). The rulemaking also directs the State Director to coordinate with Indian tribes, other affected State and Federal land management agencies and the public in the development of standards and guidelines.

By May 1995, the California State Director identified three RACs to be organized in the state and asked for nominations for membership. These RACs were organized on the previous BLM District boundaries in California for the Susanville, Ukiah And Bakersfield Districts. The membership of the RACs are a cross-section of the varying interests in public land management for the area. (The guidelines for the make-up of the membership is prescribed in the rulemaking.) Charters for the RACs, as well as nominations for membership, were submitted to the Secretary of the Interior for approval by July 1995. After formal approval, the State Director announced the formation and initial membership of the RACs on August 22, 1995. (See Chapter 5 for a complete list of RAC members.)

The California Desert Conservation Area (California Desert District) in southern California, has an advisory committee established by section 601 of the Federal Land Policy and Management Act of 1976. Since this advisory council already serves in the same capacity as that identified for the RACs, it was decided to consult with the existing advisory committee in the development of standards and guidelines for southern California, rather than organize an additional group for this purpose.

The location of each RAC area, including the California Desert District Advisory Committee (DAC), as well as the RACs located adjacent to California in Oregon and Nevada are shown on Map 2.

During the spring of 1995, a BLM team was formed for the purpose of assisting the RACs in developing standards and guidelines, and to review existing BLM land use plans for conformity with the new rules.

On September 21, 1995, an initial meeting was held simultaneously with all the RACs, nationally, including a television conference briefing and call by the Secretary of the Interior. This briefing was also given to the California Desert District's DAC. The first major assignment given to the RACs was to provide advice regarding the development of standards and guidelines. Following this briefing, each RAC developed committees for this purpose, and several subsequent meetings and workshops were held by each RAC or RAC subgroup to develop standards and guidelines for the State Director's consideration. These workshops and meetings involved negotiations among the membership of each RAC, and included participation by interested members of the public as well. Each RAC also reviewed draft proposals from the other California RACs and from some of the other states for comparisons and coordination. The RACs all reported that the most challenging issue in this process was to determine the appropriate level of specificity to include in the standards and guidelines.

During this time state-wide workshops were also held with the BLM team, RAC members and representatives, State and Federal agency representatives, and representatives of organizations interested in public land management. The purpose of these workshops was to help the RACs coordinate their efforts, to provide guidance and interpretations of the rulemaking for standards and guidelines, and to determine future strategies for completing the development of state-wide standards and guidelines. Information was also shared about standard and guideline development efforts in adjacent states.

1.6 PUBLIC SCOPING, ISSUES

A Notice of Intent was published in the Federal Register on March 25, 1996 announcing the intent to prepare an environmental impact statement for the development of rangeland standards and guidelines in California and northwestern Nevada. This notice also asked for comments concerning the scope of the EIS and Plan Amendment. Due to concerns by some of the interested public that sufficient notification was not provided, public scoping (comments on issues to be addressed, or comments on the scope of the analysis) was allowed in July, and an additional formal public scoping period was opened for 30 days during August and September 1996.

The new grazing regulations require that the standards and guidelines developed by the State Director must meet the fundamentals for sustaining and enhancing the environmental health of rangelands. Therefore, the decisions within this EIS will only identify standards for healthy rangelands and guidelines which will enable us to meet those standards; and will incorporate those standards and guidelines into existing land use plans.

The following topics were identified at a workshop on June 25, 1996 for possible consideration in the analysis: vegetation communities, special status plants, wildlife, recreation, cultural resources, economics relative to grazing, social values, BLM economic concerns involving

grazing administration, economic affects to local communities, water quality and quantity, watershed and soil relationships, fisheries, and riparian habitat.

During the public scoping periods, the following major issues and concerns were raised:

1. Native plant communities and species, including goals of reintroducing native species in areas dominated by non-natives;
2. Implementation on each allotment, including time frames, yearly scientifically valid monitoring and evaluation, how grazing allotment plans will be developed;
3. Existing laws -- Clean Water Act, Endangered Species Act, Wild Horse and Burro Act, Federal Land Policy and Management Act, etc. -- and the standards within those laws;
4. A "rapid recovery" alternative;
5. Rest rotation, deferred grazing, season of use, suitability, etc. in the alternatives;
6. Protection of riparian areas and fragile desert areas (less than 10" precipitation);
7. The need to make the RAC guidelines more specific, and, conversely, the need to make them less specific (need to allow flexibility for site-specific solutions);
8. The need to have all guidelines based upon documented scientific research, and to show the connection between the guideline and the standard(s) it is designed to achieve (specific examples are stubble height, residual dry matter);
9. The need for state-wide, consistent guidelines, and, conversely, the need for regional guidelines that address regional concerns;
10. Impacts on fuel loads and fire danger;
11. Definition of terms and clarification of intentions, including a request that we not use subjective terms; and,
12. Statements of desired conditions need to indicate the species composition or key indicator species for the various ecosystems.

The complete text of all scoping letters are on file in BLM's California State Office.

1.7 PARAMETERS FOR DEVELOPING AND IMPLEMENTING STANDARDS AND GUIDELINES

The following parameters are being used for analysis purposes and the future implementation of standards and guidelines for rangelands in the planning area:

1. The standards and guidelines selected through this EIS will be incorporated into (and thereby amend) all existing BLM land use plans in the planning area, except as described in Section 1.11 below. Allotment management plans and other activity plans will also be amended as necessary to comply with these standards and guidelines.
2. Standards and guidelines will not replace management plan objectives such as Desired Plant Communities (DPCs). However, management plan objectives will be examined to see that they conform to and support the standards and guidelines, and that they will result in achieving healthy rangelands.
3. It is not within the scope of this EIS to assess the rangeland health or grazing suitability of any specific tract of public rangeland or grazing allotment.

4. The standards and guidelines for managing rangelands for the planning area will apply to the grazing of livestock on all public rangelands in the planning area as the lands are determined available for livestock grazing use. (Again, except as in Section 1.11 below.)
5. It is understood that public land uses other than those related to livestock grazing activities also contribute to rangeland health conditions, but these will not be analyzed in this document.
6. Much of the implementation will occur when monitoring or verified observation indicates management changes are needed. Changes will be made within physical and financial constraints and on a priority basis as determined by BLM managers.
7. Much of the implementation will be determined and applied through collaborative management approaches, such as through Coordinated Resource Management planning or integrated planning efforts with other land owners, organizations, and agencies on a regional or watershed scale.
8. At a minimum all implementation will be coordinated and in consultation with the affected grazing permittees/lessees, the appropriate State agencies or Tribes having lands or resources within the area, and the interested public as known for any given allotment or rangeland area.
9. Due to the natural features (climate, topography, soils, presence of naturalized, non-native plants, etc.) some locations may take a very long time to meet standards.
10. The values and demand for use of the public rangelands will continue to increase and be diverse.
11. There will be no arbitrary removal of livestock. If removing livestock will not fix a problem (even if improper grazing practices originally caused the problem), then livestock will not be removed.

1.8 ISSUES NOT ADDRESSED IN THE ANALYSIS

The following issues will not be directly addressed within the EIS. They are primarily drawn from the list of issues identified in Section 1.6.

1. The viability of native plant and animal communities must be addressed in the standards and guidelines. However, the whole-sale reintroduction of native species in the annual grasslands will not be discussed in this document. Desired plant communities or other management goals are management decisions more properly made in a Resource Management Plan through the normal public planning process.
2. The identification of the specific actions needed, the scheduling, and the prioritization for implementation in meeting the standards and guidelines for rangeland health will occur as site-specific assessments and information indicate the need for on-the-ground change and will not be analyzed in this document. However Section 2.4 in Chapter 2

addresses how BLM will approach implementation; and Appendix 21 provides an initial implementation schedule.

3. BLM will continue to follow existing laws such as the Clean Water Act, Free-Roaming Wild Horse and Burro Act, various cultural resource protection acts, etc. These will not be discussed in this EIS.
4. Rest rotation, deferred grazing, and other management systems have been extensively analyzed in other environmental documents. The guidelines direct the manager to use grazing systems that will lead to meeting the standards. Local grazing practices will be decided case-by-case, and may be modified as needed to meet the standards.
5. Conditions and site potential vary tremendously across California and NW Nevada, depending upon climate, topography, and soil type. The guidelines are quite generic, with the intent that management actions be developed for a specific location based upon the conditions at that site.

1.9 ANALYSIS AREA

The analysis area includes those portions of California represented by the Bakersfield, Ukiah, and Susanville Resource Advisory Councils (RACs). See Map Number 3 for the location of the analysis area. This area encompasses 5.7 million acres of public rangelands of which approximately 4.2 million acres are in California and 1.5 million acres in Nevada. Currently there are 649 grazing allotments within the area consisting of 4,350,000 acres of public rangeland producing 338,715 animal unit months (AUMs) of livestock forage. This area is administered by ten BLM Field Offices. The number of grazing allotments, acres of public land available for grazing and animal unit months (AUMs) of authorized grazing use (preference) by office are shown in Table 1.9.

Table 1.9: Analysis Area			
Field Offices	# Allotments	# Acres (000)	# AUMs
Redding	38	32	3,658
Clear Lake	15	20	1,580
Arcata	11	35	4,122
Eagle Lake	57	990	52,039
Surprise	52	1,454	97,515
Alturas	157	501	56,330
Bishop	60	614	36,931
Folsom	65	69	7,341
Caliente	113	469	56,225
Hollister	81	166	22,974
TOTAL	649	4,350	338,715

1.10 CALIFORNIA DESERT CONSERVATION AREA

Early on in the process, the Desert Advisory Council (DAC) for the California Desert District (CDD), chose not to initiate a new planning process solely for livestock grazing standards and guidelines, but rather to develop standards and guidelines for all public land uses through the ongoing coordinated management planning efforts for the District. Their rationale was that the existing land use plans for the CDD largely conform to the fundamentals for rangeland health or the intentions as identified in the rulemaking, and that it would be better and more efficient to address the development of specific standards and guidelines within the individual Coordinated Management Plans. Accordingly, the development of standards and guidelines for the CDD will be postponed until the development of coordinated management plans in the CDCA or when other needs may drive plan amendments for the South Coast Resource Management Plan and planning for Eastern San Diego County. These planning efforts will include the Western Mojave Coordinated Management Plan, Northern and Eastern Colorado Desert Coordinated Management Plan, Northern and Eastern Mojave Planning Effort (3 separate plans), Coachella Valley Habitat Conservation Plan, Plan Amendment for the South Coast Resource Management Plan, and the Eastern San Diego Area Plan.

Therefore the CDD area of California will not be included in the analysis area for this EIS. During the interim, as provided by the regulations, the CDD will follow the fallback standards and guidelines or existing planning guidance, whichever is more protecting of the fundamentals for rangeland health.

Based upon this current process, the State Director will submit a set(s) of standards and guidelines for approval by the Secretary of the Interior for those portions of California and NW Nevada, excluding the CDD administrative area.

1.11 OTHER PLANS AND NEPA ANALYSIS

In 1994, the BLM completed a national Environmental Impact Statement entitled "Rangeland Reform 94." This document serves as the basic NEPA analysis for the rulemaking of February 22, 1995, that included the direction and identification of criteria for the development of rangeland standards and guidelines on a state or regional level. This EIS effort will tier to the national "Rangeland Reform 94" EIS where appropriate.

On April 13, 1994, a Record of Decision was developed by the BLM and USDA Forest Service which amended planning documents within the range of the Northern Spotted Owl, a threatened species. That document also included standards and guidelines for managing activities on public lands within the range of the habitat area. Some of the specific standards and guidelines relate to grazing management activities in specific types of habitats and are recognized as the current standards and guidelines to be followed in those instances. Those standards and guidelines and subsequent plan amendments will remain as policy and will not be reconsidered or analyzed in this EIS effort. Those standards and guidelines are primarily applicable to some of the grazing allotments managed by the Arcata Field Office as well as a few allotments managed by the Redding and Clear Lake Field Offices. This EIS will tier where appropriate to the final supplemental EIS prepared in February of 1994 on management of habitat for late-successional and old-growth forest related species within the range of the Northern Spotted Owl.

During March of 1994, the BLM and the USDA Forest Service prepared an environmental assessment (EA), commonly known as the "PACFISH" EA, for the implementation of interim strategies for managing anadromous fish-producing watersheds in the Columbia River Basin (outside of the range of the Northern Spotted Owl) and portions of California. The PACFISH EA included management strategies for livestock grazing for defined riparian habitat conservation areas within anadromous watersheds. Currently only the Redding Field Office has authorized livestock grazing on public lands within these areas. The decision record developed in February 1995 by the two agencies directed that the management strategies proposed in the EA be implemented for an 18 month period while long-term management strategies are developed through geographic specific environmental analyses. Subsequently both agencies have directed that the standards and guidelines proposed in PACFISH continue to be implemented and formally adopted for implementation. The BLM recognizes the PACFISH standards and guidelines as the applicable standards and guidelines where intended by that record of decision. This EIS, then, will tier from the PACFISH EA where applicable.

The BLM developed EISs for grazing management of available public rangelands in California and Northwestern Nevada, starting in 1979 and finishing in 1985. Much of the information and assessments contained in those documents remain valid and this EIS will tier to these documents where appropriate. Appendix 2 contains a table listing the titles, locations of areas covered, and dates of the grazing EISs.

The BLM developed numerous land use plans including both Management Framework Plans (MFPs) and Resource Management Plans (RMPs) covering resource management of public lands in California and Northwestern Nevada, from 1978 to 1997. Most parts of those plans remain valid, except that they will be amended to include the standards and guidelines developed through this process and any decisions within those plans that does not conform to the standards and guidelines will be deleted or amended to conform. Appendix 4 contains a

table listing the titles, locations and dates of those plans. Allotment management plans and other activity plans will also be amended as necessary to comply with these standards and guidelines.

1.12 LEGAL FRAMEWORK

The Bureau of Land Management operates under a number of federal and state laws and regulations. Appendix 3 contains a listing of some of the major laws that affect BLM's management of public lands.

CHAPTER 2: DESCRIPTION OF THE ALTERNATIVES

2.1 INTRODUCTION

There are five alternatives considered and analyzed in this document. Alternative 1 consists of the standards and guidelines developed by the three Resource Advisory Councils (RACs) for their representative areas. Alternative 2 consists of the state-wide standards developed by BLM, in consultation with representatives from each of the RACs, but without concurrence by the entire RAC membership. The guidelines for Alternative 2 are essentially the same as those for Alternative 1. Alternative 3 is adoption of the national "fall-back" standards and guidelines listed in the regulations. Alternative 4 is a rapid improvement or rapid recovery alternative developed by BLM, with suggestions from several interest groups. The Standards in Alternative 4 are the same as those in Alternative 2, except for Water Quality. These four alternatives are the same as those found in the Draft EIS.

Alternative 5, the preferred alternative or proposed action, is a modified version of Alternative 1, with changes based upon suggestions and new information from the public, the RACs and BLM.

A "no action" alternative consisting of the previous (prior to the new regulations) grazing management was considered and dropped. This is not a viable alternative because the new grazing regulations include a mandatory set of "fall-back" standards and guidelines. As the BLM did not develop and implement state or regional standards and guidelines by August 12, 1997, the "fall-back" standards and guidelines are in effect until state or regional standards and guidelines are developed. Therefore, the application of the fallback standards and guidelines is the current "no action" alternative.

A "rapid recovery" alternative submitted by the California Native Plant Society was considered and dropped. This was not considered a viable alternative because of several provisions within the proposal that are contrary to law or regulation, or are arbitrary (see the comments section in Chapter 5 for further analysis). However, portions of this proposal were used to formulate Alternative 4.

2.2 PLAN AMENDMENTS

In accordance with the range regulations at 43 CFR 4100, existing land use plans (Resource Management Plans, Management Framework Plans, and special plans such as PACFISH) have been examined to determine their compliance with the new regulations and the principles of rangeland health. In most cases, these plans do comply.

These existing land use plans will be amended to include the standards and guidelines that are adopted through this EIS. Where there are plan decisions that are contrary to the new regulations and the principles of rangeland health, those decisions will be removed from the plans or amended to comply. A complete list of the affected plans is in Appendix 4; a statement of the plan maintenance to be completed is in the Implementation Plan in Appendix 21. Allotment management plans and other activity plans will also be amended as necessary to comply with these standards and guidelines.

Where "desired plant community" (DPC) objectives have been determined through the BLM planning and NEPA processes, the DPCs will be evaluated to ensure that they meet the standards of rangeland health. Where DPCs have not yet been determined for a pasture or allotment, they will be developed through the BLM planning and NEPA processes to meet local and regional management objectives, and will meet the standards of rangeland health.

2.3 WATER QUALITY -- BEST MANAGEMENT PRACTICES

To meet the requirements of the Clean Water Act, BLM is currently developing a state-wide water quality management plan under an MOU with the California Water Resources Control Board. This water quality management plan would designate BLM as being responsible for water quality issues on those public lands managed by BLM. As part of the water quality plan, we are required to submit a list of Best Management Practices (BMPs) to the State and to the U.S. Environmental Protection Agency for their approval. Appendix 10 contains the proposed best management practices. One of the decisions of this document will be to finalize the list of best management practices so that it may be submitted for approval.

2.4 IMPLEMENTATION

It is BLM's intent to fully implement the grazing standards and guidelines as directed in the recent rulemaking. The rule states that, "The authorized officer shall take appropriate action as soon as practicable but not later than the start of the next grazing year upon determining that grazing practices or levels of grazing use on public lands are significant factors in failing to achieve the standards and conform to the guidelines . . ." (43 CFR 4180.2 (c)). Determination of the "appropriate action," and the actual scheduling of the implementation, will be the responsibility of the local Field Managers.

The implementation process will follow four basic steps, including an initial screening, management change, monitoring, and additional inventory or assessment.

Screening

BLM will classify each allotment or manageable grazing unit into one of four categories, based upon available data and the professional judgement of the staff. These are:

1. Areas where one or more standards are not being met, or significant progress is not being made toward meeting the standard(s), and livestock grazing is a significant contributor to the problem;
2. Areas where all standards are being met, or significant progress is being made toward meeting the standard(s);
3. Areas where the status for one or more standards is not known, or the cause of the failure to not meet the standard(s) is not known;
4. Areas where one or more standards are not being met, or significant progress is not being made toward meeting the standard(s), but some factor other than livestock grazing is the primary contributor to the problem.

Management Change

For allotments or manageable grazing units in Category 1 above:

1. Prioritize the areas based upon ecosystem position, resource risk, biological values, legal requirements, and social / economic considerations.
2. Using the NEPA process and the guidelines, make a decision of what the appropriate grazing management changes should be.
3. Implement the management change(s).

For allotments or manageable grazing units in Category 4 above:

1. Prioritize the areas based upon ecosystem position, resource risk, biological values, legal requirements, physical ability to affect change, and costs to implement.
2. Using the NEPA process, make a decision of what the appropriate corrective action(s) (under current regulation and policy) should be.
3. Implement the corrective action(s) as priorities, practicality and funding allow.

Monitoring

1. For allotments or manageable grazing units in Category 2 above:

Monitor these areas to ensure that they continue to meet the standards or make significant progress toward meeting the standards.

2. For allotments or manageable grazing units in Category 1 above:

Monitor these areas to ensure that the management changes are made, and that they are resulting in the area meeting the standards or making significant progress toward meeting the standards.

3. For allotments or manageable grazing units in Category 4 above:

Monitor these areas to ensure that the corrective actions are taken, and that they are resulting in the area meeting the standards or making significant progress toward meeting the standards.

Inventory and Assessment

For allotments or manageable grazing units in Category 3 above:

1. Prioritize the areas based upon ecosystem position, resource risk, biological values, legal requirements, and social / economic considerations.

2. Conduct riparian / wetland and/or upland functional assessment inventories to determine conditions in relationship to the standards.
3. Conduct evaluations to determine livestock cause and effect relationships.
4. Re-classify as Category 1, 2, or 4, then Implement Management Change, Corrective Action and Monitoring actions as appropriate.

Prioritization

Under current funding levels, it will not be possible to complete assessments of rangeland health on all public rangelands and to take appropriate corrective action immediately upon the standards and guidelines taking effect. This was recognized in the preamble to the final rulemaking where it states that, "the Department recognizes that it is not possible to complete all assessments of rangeland health and take appropriate corrective action . . . immediately upon completion of the State or regional standards and guidelines. The Department intends that assessments and corrective actions will be undertaken in priority order as determined by BLM." (Federal Register, Vol. 60, No. 35, 2/22/95, page 9956)

There are allotments and grazing units where BLM knows there are problems directly attributable to grazing, but no management actions have been taken. These areas will fall into Category 1. Some of the areas with known problems have already had management actions implemented. Dependent upon the success of the actions, these would fall into Category 1, requiring additional actions, Category 2, or Category 3.

Priorities for assessments and for corrective actions will be determined by the BLM, dependent upon a number of factors. These include, but are not limited to:

1. the severity of resource impacts resulting from non-achievement of the standard and conformance with the guidelines;
2. the anticipated cooperation of the permittee/lessee;
3. the return on investment in any corrective action;
4. the size of the affected area;
5. legal mandates;
6. the ability to arrest further degradation;
7. the proportion of Federal land in the allotment; and,
8. any pending administrative actions, i.e. renewal, transfer, etc.

Priorities will also depend upon the characteristics of the landscapes involved, and their potential for improvement -- as an example, if an area is severely degraded or has passed a threshold and there seems little or no chance for recovery because the recovery capability of the site has been lost.

Focusing limited BLM resources on low priority areas at the expense of postponing assessment and needed action on higher priority areas is not in the best interest of sound rangeland management. Therefore, the authorized officer must consider the expected return to the public in setting priorities and deciding what constitutes an appropriate action. All such decisions will have a sound, rational basis, and be well documented.

Currently each Field Office in California maintains a prioritization of management needs and emphasis for each grazing allotment based on a Bureau-wide system established in the early

1980's, commonly called the I,M,C system. This system of identification may still continue to be appropriate, providing that rangeland health status and needs are also included in the criteria for prioritization; or it may change. Appendix 5 identifies the number of allotments under current prioritization categorization criteria for each of the Field Offices, as well as a description of the categories.

Appendix 6 is a flow chart showing the general implementation process.

Appendix 21 shows which allotments managed by each Field Office are in each category.

2.5 ALTERNATIVE 1: STANDARDS & GUIDELINES ORIGINALLY PROPOSED BY THE RESOURCE ADVISORY COUNCILS

This alternative includes three sets of proposed rangeland standards and guidelines, one for each of the RAC areas -- Bakersfield, Ukiah and Susanville. Each RAC worked with local interests, and knowledgeable BLM staff to develop standards and guidelines that would meet the needs of their area.

2.51 BAKERSFIELD RAC RECOMMENDED STANDARDS AND GUIDELINES

Standards and Guidelines for Rangeland Health in The Bakersfield District

Preamble

The standards for rangeland health and guidelines for livestock management on Bureau of Land Management lands are written to accomplish the four fundamentals of rangeland health, insofar as the standards are affected by livestock grazing practices. Those fundamentals are:

- A. Watersheds are properly functioning;
- B. Ecological processes are in order;
- C. Water Quality complies with State standards; and,
- D. Habitats of protected species are in order.

A " standard " serves as the criterion to determine if management actions are resulting in the maintenance or attainment of healthy rangelands per the four fundamentals of rangeland health. Standards are expressions of physical and biological conditions or degree of function required for healthy, sustainable rangelands. " Guidelines " serve as the vehicle to implement management actions related to livestock grazing to accomplish rangeland health standards. Guidelines will indicate the types of grazing methods and practices determined to be appropriate to ensure that standards can be met. The public should be an active participant in the application of these standards and guidelines.

Standards and guidelines will apply to all BLM lands within the geographic area for which they are written. Using the complete set of standards and guidelines, the local BLM range managers, in consultation with grazing permittees and other interested parties, will determine

"terms and conditions" for each grazing allotment. These terms and conditions are the specific grazing practices that are appropriate for that allotment.

BLM lands vary so greatly in topography, climate, soils, water availability, size and distribution of parcels, and other factors, that local managers must have the flexibility needed to determine which grazing practices will work best in each area, and to change those practices when necessary to achieve the desired rangeland conditions.

Where "desired plant community" (DPC) objectives have been determined through the BLM planning and NEPA processes, the DPCs will be a measure in meeting the standards of rangeland health. Where DPCs have not yet been determined for a pasture or allotment, they will be a measure in meeting the standards of rangeland health when they are approved through the BLM planning and NEPA processes.

The scientific evidence and collective knowledge of the public and rangeland managers shows a wide variety of grazing effects on plants, animals and watersheds. As a result, the application of these standards and guidelines will emphasize using the best available information for a site-specific situation, and the results of historical grazing patterns should be given significant weight in any decisions about grazing practices to be followed on BLM allotments. Where historical grazing use has been compatible with meeting the standards for soils, species, riparian areas or water quality, no permanent changes should be mandated in the existing grazing patterns without substantial scientific evidence that changing the existing grazing pattern will improve the ability to achieve the standards.

For any standard, guideline, term, or condition to work, it must be capable of being achieved, based on sound science or good common sense, and be measurable, understandable, and economically feasible. There is no use in setting standards that can not be met.

Successful application of these standards and guidelines will depend on BLM's capability to monitor rangeland conditions and implement management practices. Each Bureau office should develop a monitoring and implementation plan that sets priorities based on resource conditions, trends, and resource values.

BAKERSFIELD STANDARDS FOR RANGELAND HEALTH

STANDARD: SOILS

Soils exhibit functional biological and physical characteristics that are appropriate to soil type, climate, and land form.

Meaning That:

Precipitation is able to enter the soil surface at appropriate rates; the soil is adequately protected against accelerated erosion; and the soil fertility is maintained at appropriate levels.

As Indicated By:

- * Ground cover (vegetation and other types of ground cover such as rock) is sufficient to protect sites from accelerated erosion.
- * Litter/residual dry matter is evident, in sufficient amounts to protect the soil surface.
- * A diversity of plant species, with a variety of root depths, is present and plants are vigorous during the growing season.
- * There is minimal evidence of accelerated erosion in the form of rills, gullies, pedestaling of plants or rocks, flow patterns, physical soil crusts/surface sealing, or compaction layers below the soil surface
- * Biological (microphytic or cryptogamic) soil crusts are in place where appropriate.

STANDARD: SPECIES

Healthy, productive and diverse populations of native species, including special status species (Federal T&E, Federal proposed, Federal candidates, BLM sensitive, or Calif. State T&E) are maintained or enhanced where appropriate.

Meaning That:

Native and other desirable plant and animals are diverse, vigorous, able to reproduce and support the hydrologic cycle, nutrient cycles and energy flows over space and time.

As Indicated By:

- * A variety of age classes are present for most perennial plant species.
- * Plant vigor is adequate to maintain desirable plants and ensure reproduction and recruitment of plants when favorable climatic events occur.
- * The spatial distribution and cover of plant species and their habitats allows for reproduction and recovery from localized catastrophic events.
- * A diversity of plant species with various phenological stages and rooting depths are present on sites where appropriate.
- * Appropriate natural disturbances are evident.
- * Levels of non-native plants and animals are at acceptable levels.
- * Special status species present are healthy and in numbers that appear to ensure stable to increasing populations; habitat areas are large enough to support viable populations or are connected adequately with other similar habitat areas.

- * Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients.
- * Where appropriate, biological soil crusts (also called microphytic or cryptogamic soil crusts) are present and not excessively fragmented.
- * Where appropriate, species composition contributes to the desired plant community objectives.
- * Noxious and invasive species are contained at acceptable levels.

STANDARD: RIPARIAN

Riparian/wetland vegetation, structure and diversity and stream channels and floodplains are, or are making significant progress toward, functioning properly and achieving an advanced ecological status.

Meaning That:

The vegetation and soils interact to capture and pass sediment, sustain infiltration, maintain the water table, stabilize the channel, sustain high water quality, and promote biodiversity appropriate to soils, climate, and landform.

As Indicated By:

Vegetation Attributes:

- * Vegetation cover is greater than 80% or the percentage that will protect banks and dissipate energy during high flows.
- * Age-class and structure of woody/riparian vegetation is diverse and appropriate for the site.
- * Where appropriate, shading is sufficient to provide adequate thermal regulation for fish and other riparian dependent species.
- * Where appropriate, there is adequate woody debris.
- * A diversity of plant species with various phenological stages and rooting depths are present. Root masses are sufficient to stabilize stream banks and shorelines.
- * Plant species present indicate that soil moisture characteristics are being maintained.
- * There is minimal cover of invader/shallow-rooted species.
- * Adequate organic matter (litter and standing dead plant material) is present to protect the site and to replenish soil nutrients through decomposition.
- * Point bars are vegetated.

Physical Indicators:

- * Streambank stability, pool frequency, substrate sediments, stream width, and bank angles are appropriate for the stream type (using D. Rosgen's Stream Classification System).

STANDARD: WATER QUALITY

Surface and groundwater quality complies with California, or other appropriate (e.g. Nevada or Tribal) water quality standards.

Meaning That:

BLM actions do not contribute to pollution that violates the quantitative or narrative standards of the California and Nevada water quality standards (WQS). Approved Best Management Practices (BMPs) are used to protect water quality or restore water quality to water bodies not fully supporting designated beneficial uses, e.g., water quality limited segments.

As Indicated By:

- * Chemical constituents do not exceed the WQS.
- * Water temperature does not exceed the WQS.
- * Nutrient loads, fecal coliform, turbidity, and dissolved oxygen do not exceed the WQS.
- * Aquatic organisms and plants (e.g., macroinvertebrates, fish, algae and plants) indicate support for beneficial uses.

BAKERSFIELD RAC GUIDELINES FOR GRAZING MANAGEMENT:

Guideline 1: Livestock grazing operations will be conducted so that progress is made toward maintaining or promoting adequate amounts of vegetative ground cover, including standing plant material and litter to support infiltration, permeability, and maintain soil moisture storage and soil stability appropriate for the ecological sites within the management units. The ground cover should maintain soil organisms, plants, and animals to support the hydrologic and nutrient cycles, and energy flow.

Guideline 2: Implement grazing systems that regulate the timing and intensity of grazing. Continuous season-long grazing use is allowed if it has been demonstrated that it can be consistent with achieving a healthy, properly functioning ecosystem. Grazing systems should specify season of use based on plant phenology and geohydrologic processes where appropriate. On annual rangelands, mulch management should be used to define target forage use levels that will ensure that sufficient amounts of residual dry matter (RDM), or standing plant material will be maintained throughout the grazing season. Mulch levels for annual grasses should meet the requirements of Table A, whenever feasible. Mulch levels will include a "buffer" to account for RDM loss from other natural processes (decomposition, animal use,

etc.). Exceptions may be approved during the green season when substantial regrowth is expected or if lower RDM levels are required to meet particular rangeland health objectives, such as reducing competition for a desired species.

Guideline 3: Where appropriate, use grazing systems that maintain the presence and distribution of microsites for seed germination.

Guideline 4: Perennial plant utilization should be limited to appropriate levels of the current year's growth, unless it has been proven that this level of use is incompatible with the continued existence of the plant. (Table A)

Guideline 5: Annual range readiness will be determined by: 1) Minimum RDM levels at the time of turnout prior to green season growth are exceeded by 200 pounds per acre; or 2) Minimum RDM levels and at least 2 inches of new growth are present in the growing season.

Guideline 6: Implement grazing systems that permit existing native species to complete entire life cycles and sustain the spatial distribution of microsites necessary for seed germination at intervals sufficient to maintain the viability of the species.

Guideline 7: Use grazing systems that are compatible with the persistence of desired species. Grazing use should provide appropriate levels of plant matter that will promote the existence of desirable plants and animals.

Guideline 8: Native species are recommended for all revegetation and enhancement projects unless they are not readily available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.

Guideline 9: Periods of rest from livestock grazing or other avoidable disturbances should be provided during/after episodic events (e.g. flood, fire, drought) and during critical times of plant growth needed to achieve proper functioning conditions, recovery of vegetation, or desired plant community.

Guideline 10: Grazing management practices will allow for the reproduction of species that will maintain riparian-wetland functions including energy dissipation, sediment capture, groundwater recharge, streambank stability, the hydrologic cycle, nutrient cycle, and energy flow.

Guideline 11: Grazing practice should maintain a minimum herbage stubble height on all stream-side areas at the end of the grazing season (Table A). There should be sufficient residual stubble or regrowth at the end of the grazing season to meet the requirements of plant vigor maintenance, bank protection, and sediment entrapment.

Guideline 12: Water sources, wetlands and riparian areas may be fenced to reduce impacts from livestock.

Guideline 13: The development of water sources will maintain ecologic and hydrologic function and processes.

Guideline 14: Locate salt blocks and other supplemental feed well away from riparian/wetland areas.

Table A: Forage Utilization and Mulch Management Requirements				
Precipitation	Plant Community	Slope, Elevation	Minimum Residual Dry Matter* (lbs/ac)	Maximum Utilization of Key Perennials, #, ##
4-10 Inches	California annual grassland	<25% 25-45% >45%	200 250 350	25-40%
10-40 Inches	California annual grassland, Oak woodlands	<25% 25-45% >45% <15%, 1000-2500 >15%, >2500	400 600 800 700-900** 1000-1200**	30-45%
8-30 Inches	Sagebrush grassland, Pinyon-juniper woodland, Cool season pasture	NA	NA	30-40%
4-40 Inches	Riparian areas, wetlands	NA	4-6 inch stubble height #	35-45% herbs, 10-20% shrubs, 0-20% trees

* Minimum to be present at fall green/winter green-up.

** Higher minimum is for sites that are: in unsatisfactory condition, grazed during active growth, not rested, or on steeper slopes.

Stubble height and percent utilization levels are initial values that should be adjusted to consider timing of grazing use and plant phenology, resource conditions and a site's resiliency at the allotment, pasture or site-specific location. Perennial plant utilization levels and stubble heights are based on a literature review by Jerry L. Holechek, Policy Changes on Federal Rangelands: A Perspective, or A Wall Street Perspective on Management of Federal Rangelands. National Public Lands Advisory Council, November 19, 1991. Golden CO.

On sites in unsatisfactory condition and/or trend, perennial plant utilization should be no more than 15-25% current annual growth where less than one period of rest is provided per growing season of use.

Guideline 15: Locate new livestock handling and/or management facilities outside of riparian/wetland areas. For existing livestock handling facilities inside riparian area, ensure that facilities do not prevent attainment of standards. Limit livestock trailing, bedding, watering, loading, and other handling efforts to those areas and times that will not retard or prevent attainment of standards.

Guideline 16: Implement grazing systems that will promote compliance with the Water Quality Standards.

2.52 UKIAH RAC RECOMMENDED STANDARDS AND GUIDELINES

Standards and Guidelines for Rangeland Health in The Ukiah District

Preamble

The standards for rangeland health and guidelines for livestock grazing on BLM administered lands are written to accomplish the four fundamentals of rangeland health, insofar as they are affected by livestock grazing practices. These fundamentals are:

- A. Watersheds are properly functioning;
- B. Ecological processes are in order;
- C. Water quality complies with state standards; and,
- D. Habitats of protected species are in order.

Additionally, the standards and guidelines must be consistent with those of adopted regional conservation strategies which affect the Northwestern California public lands under the purview of the Ukiah Resource Advisory Council. The Northwest Forest Plan (NFP)(USDI, USDA, 1994) encompasses the entire range of the northern spotted owl and provides a set of land allocations and standards and guidelines for management activities. It contains both terrestrial and aquatic conservation strategies. Range management standards and guidelines are directed toward attainment of aquatic conservation strategy objectives through management of riparian reserves. The Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH) (USDI, USDA, 1995) extends riparian standards and guidelines as in the NFP to all anadromous watersheds beyond the range of the northern spotted owl.

The RAC and BLM staff reviewed these standards and guidelines during development of the Standards for Rangeland Health and Guidelines for Livestock Grazing to ensure that the Aquatic Conservation Strategy objectives of the NFP and Riparian Management Objectives of PACFISH were consistent, and that the standards and guidelines were consistent with the BLM's Redding and Arcata Resource Management Plans.

A "standard" serves as the criterion to determine if management actions are resulting in the maintenance or attainment of healthy rangelands per the four fundamentals of rangeland health. Standards are expressions of physical and biological conditions or degree of function required for healthy sustainable rangelands. Guidelines serve as the vehicle to implement management actions related to livestock grazing to accomplish the rangeland health standards. Guidelines will indicate the types of grazing methods and practices determined to be appropriate to ensure that the standards can be met.

Standards and guidelines will apply to all BLM lands within the geographic area for which they are written. Using the standards and guidelines, the local BLM managers, in consultation with grazing permittees and other interested parties, will determine terms and conditions for each grazing allotment. These terms and conditions are the specific grazing practices that are appropriate for that allotment.

BLM lands vary so greatly in topography, climate, soils, water availability, size and distribution of parcels and other factors that the local managers must have the flexibility needed to

determine which grazing practices will work best in each area, and to change those practices when necessary to achieve the desired rangeland conditions.

Where desired plant community (DPC) objectives have been determined through the BLM planning and NEPA processes, the DPCs will be a measure in meeting the standards of rangeland health.

Where historical grazing has been compatible with meeting the standards for soils, species, riparian areas or water quality, no permanent changes should be mandated in the existing grazing patterns without substantial scientific evidence that changing the grazing pattern will improve the ability to achieve the standards.

For any standard, guideline, term or condition to work, it must be capable of being achieved, based on sound science or good common sense, and be measurable, understandable, and economically feasible. There is no use in setting standards that cannot be met.

UKIAH STANDARDS FOR HEALTHY RANGELANDS

STANDARD: SOILS

Soils exhibit characteristics of infiltration, fertility, permeability rates and other functional biological and physical characteristics that are appropriate to soil type, climate, desired plant community, and land form.

Meaning That:

Precipitation is able to enter the soil surface at appropriate rates; the soil is adequately protected against accelerated erosion; and the soil fertility is maintained at appropriate levels.

As Indicated By:

- * Ground cover (vegetation and other types of ground cover such as rock) sufficient to protect sites from accelerated erosion.
- * Litter/residual dry matter evident, accumulating in place, and showing negligible movement by water.
- * A diversity of plant species, including native plants, with a variety of root depths, is present and plants are vigorous during the growing season. (Rangeland Health, National Research Council, 1994, page 130, table 4-8).
- * There is minimal evidence of accelerated erosion in the form of rills, gullies, pedestaling of plants or rocks, flow patterns, physical soil crusts/surface sealing, or compaction layers below the soil surface.
- * Biological (microphytic or cryptogamic) soil crusts, if present, are intact.

STANDARD: SPECIES

Healthy, productive, and diverse populations of native plant and animal species, particularly special status species, are maintained and/or being restored.

Meaning That:

As Stated.

As Indicated By:

- * A variety of age classes are present for desired plant species (Rangeland Health, National Research Council 1994, page 130 table 4-8).
- * Plant vigor is adequate to maintain desirable plants and ensure reproduction and recruitment of plants when favorable climatic events occur.
- * The spatial distribution of plant and animal species and their habitats allows for reproduction and recovery from localized catastrophic events.
- * A diversity of plant species with various developmental stages and rooting depths are present to extend the photosynthetic period and increase energy capture.
- * Evidence of beneficial natural disturbances.
- * Non-native, noxious and invasive species are at acceptable levels.
- * Special status species and other local species of concern are healthy and in numbers that appear to ensure stable to increasing populations; habitat areas are large enough to support viable populations or are connected adequately with other similar habitat areas.
- * Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and support nutrient cycling.
- * Where appropriate, biological soil crusts (also called microphytic or cryptogamic soil crusts) are present and not excessively fragmented.
- * Species composition contributes to the desired plant community objectives.

STANDARD: RIPARIAN

Riparian/wetland vegetation, structure and diversity, and stream channels and floodplains are, or are making significant progress toward functioning properly and achieving late seral stages.

Meaning That:

The vegetation and soils interact to capture and pass sediment, sustain infiltration, maintain the water table, stabilize the channel, sustain high water quality, and promote biodiversity appropriate to soils, climate, and landform.

As Indicated By:

- * Naturally occurring vegetation cover will protect banks and dissipate energy during high flows.
- * Age-class and structure of woody/riparian vegetation is diverse and appropriate for the site. Recruitment of preferred species is adequate for sustaining the community.
- * Where appropriate, habitat is sufficient to provide for plant and animal riparian dependent species. There is diversity and abundance of insects and amphibians.
- * Where appropriate, there is adequate woody debris.
- * A diversity of plant species with various developmental stages and rooting depths is present (Rangeland Health, National Research Council 1994, page 112, and table 4-8 on page 130). Root masses are sufficient to stabilize stream banks and shorelines.
- * Plant species present indicate that soil moisture characteristics are being maintained.
- * Shallow-rooted, invader plant species are not displacing native species.
- * Adequate organic matter (litter and standing dead plant material) is present to protect the site and to replenish soil nutrients through decomposition (Rangeland Health, National Research Council 1994, page 130, table 4-8).
- * Point bars are becoming vegetated over time.
- * Adequate stream bank stability, morphology, pool frequency, stream width depth ratio, and minimal substrate sediments and bare ground.

Exceptions and exemptions from riparian standard, where the standard may not be applicable:

Structural facilities constructed for livestock/wildlife water or other purposes which are not natural wetland and/or riparian areas. Examples are: water troughs, stockponds, flood control structures, tailings ponds, water gaps on fenced or otherwise restricted stream corridors, etc.

STANDARD: WATER QUALITY

With the exception of off-stream artificial impoundments, surface and groundwater quality complies with California, Tribal and Federal water quality standards (WQS).

Meaning That:

BLM actions do not contribute to pollution that violates the quantitative or narrative standards of the California water quality standards (WQS)). Approved Best Management Practices (BMPs) are used to protect water quality or restore water quality to water bodies not fully supporting designated beneficial uses, e.g. water quality limited segments.

As Indicated By:

- * Chemical constituents, water temperature, nutrient loads, fecal coliform, and turbidity do not exceed WQS.
- * Dissolved oxygen levels, and aquatic organisms and plants (e.g., macroinvertebrates, fish, and algae) indicate support for beneficial uses.

UKIAH GUIDELINES FOR LIVESTOCK MANAGEMENT**RIPARIAN HABITATS**

Guideline 1: Management for riparian dependent special status species, where they occur, is primary.

Guideline 2: Season of use should be short term and allow for plant regrowth and reproduction. The residual or regrowth should provide sufficient herbaceous forage biomass to meet the requirement of plant vigor maintenance, plant and wildlife habitat, stream shading, bank protection and sediment entrapment. Specific grazing dates will be set in lease terms and conditions.

Guideline 3: Locate salt blocks and supplemental feed well away from riparian zones.

Guideline 4: Locate all livestock handling and management facilities outside of riparian areas.

Guideline 5: Limit livestock trailing and watering to those areas and times that will not retard or prevent attainment of standards. Avoid trailing in vernal pools and wetlands whenever possible.

Guideline 6: Make temporary changes to livestock grazing management practices, including increases or decreases in stocking rates and seasons of use in response to important episodic events (drought, flood, fire, good germination, etc.).

Guideline 7: Degraded riparian areas may require complete rest or other change in management practices to initiate the recovery process.

Guideline 8: Limit or exclude livestock grazing in identified culturally sensitive areas where grazing is detrimental to such sites.

Guideline 9: BLM will work with livestock grazing lessees to utilize prescribed fire, fencing, rest-rotation, holistic resource management, integrated pest management, and other innovative management practices where appropriate to protect riparian health.

Guideline 10: Native species are recommended for all revegetation and enhancement projects unless they are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions or biological health.

GUIDELINES FOR ANNUAL UPLANDS

TABLE B: Residual Dry Matter (RDM) Guidelines. Definition is pounds/acre by slope and precipitation.			
Precipitation	Slope 0-25%	Slope 26-45%	Slope 46% and Up
10" - 40"	500 lbs.	600 lbs.	800 lbs.
40" - 60"	750 lbs.	1,000 lbs.	1,250 lbs.
60+"	1,000 lbs.	1,500 lbs.	2,000 lbs.

Annual Upland Rangelands

Guideline 11: If necessary to meet desired plant community (DPC), or if there is a probability to promote or enhance native perennial plant communities (including special status plants) to check degradation, then adjust grazing management practices, such as: season of use, RDM, stocking level, distribution, pasture rotation, or other range management practices.

Guideline 12: Continuous season-long grazing is allowed if it has been demonstrated that it can be consistent with achieving a healthy, properly functioning ecosystem.

Guideline 13: Alter livestock grazing or initiate erosion control practices in areas where soil is compacted or prone to accelerated erosion.

Guideline 14: BLM will work with livestock grazing lessees to utilize prescribed fire, fencing, rest-rotation, holistic resource management, integrated pest management, and other innovative management practices where appropriate.

Guideline 15: Make temporary changes to livestock grazing management practices, including increases or decreases in stocking rates and seasons of use in response to important episodic events (drought, flood, fire, good germination, etc.).

Guideline 16: Limit or exclude livestock grazing in identified culturally sensitive areas where grazing is detrimental to such sites.

Guideline 17: Degraded areas may require complete rest or other change in management practices to initiate the recovery process.

Guideline 18: The plan for grazing on any allotment must consider other uses (recreation, wildlife, mineral resource development, etc.) and be coordinated with other users of the public lands so that overall use does not detract from the goal of achieving rangeland health.

Guideline 19: Encourage grazing management practices that sustain biological diversity across the landscape by providing a mosaic of seral stages and vegetation corridors, and minimizing habitat fragmentation.

Guideline 20: Implement aggressive action to reduce the invasion of exotic plant species into native plant communities. Control the spread of noxious weeds through various methods such as grazing management, fire management, and other vegetative management practices.

Guideline 21: Utilize prescribed fire and natural prescribed fire to promote a broad vegetative diversity of healthy plant communities, while creating a mosaic network of interconnected vegetative resources.

Guideline 22: Native species are recommended for all revegetation and enhancement projects unless they are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions of biological health.

Perennial Rangeland Guidelines

Guideline 23: No authorized livestock grazing in new allotments which are native perennial grasslands until guidelines specific to these perennial species are developed and adopted.

2.53 SUSANVILLE RAC RECOMMENDED STANDARDS AND GUIDELINES

Standards for Rangeland Health and Guidelines for Livestock Grazing Susanville Resource Advisory Council

Preamble

Healthy Rangelands contribute to the social and economic well being of rural communities in Northeastern California and Northwestern Nevada, and they provide, over the long term, the most reliable harvest of rangeland resources. The objective of rangeland resource planning is to integrate BLM resources with other resources to achieve the mandate of multiple-use and sustained yield management of renewable resources in an environmentally sound and cost effective manner.

The **Standards** of rangeland health are expressions of physical and biological condition or degree of function required for healthy, sustainable rangelands. The Standards are applied on a landscape scale. Some standards may not apply to all acres. For example, a mosaic of vegetation types and age classes may produce the diversity associated with healthy rangelands; however, some individual vegetation communities within the mosaic may lack diversity.

The Standards always relate to the capability or potential of a specific site. The land will not be expected to produce vegetation or support habitats not attainable due to climate, soils or other limiting attributes. In instances where site capability or potential has changed due to man-caused or natural disturbance, recognition will be given to the modified capability when setting or assigning a standard to (for) the site. The Standards are designed to establish the threshold

for healthy rangelands. In some circumstances, an exception to the Standards or Guidelines may be necessary or unavoidable; however, **these instances should be under extreme conditions only**, and fully justified (documented) in order to be acceptable.

The **Guidelines** for grazing management are the types of grazing management methods and practices determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard. The Guidelines were designed to provide direction, yet offer flexibility for implementation through activity plans and Terms and Conditions for grazing permits. The Bureau of Land Management (BLM) must operate within the constraints of other regulatory requirements that may affect how standards and guidelines are applied for livestock grazing, for example the Wild and Free Roaming Wild Horse and Burro Act (1971).

SUSANVILLE STANDARDS FOR RANGELAND HEALTH

STANDARD 1: UPLAND SOILS

Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform, and exhibit functional biological, chemical and physical characteristics.

Meaning that:

Precipitation is able to enter the soil surface and move through the soil profile at a rate appropriate to soil type, climate and landform; the soil is adequately protected against human caused wind or water erosion, and the soil fertility is maintained at/or improved to the appropriate level.

Criteria to Meet Standard:

- * Evidence of wind and water erosion, such as rills and gullies, pedestaling, scour or sheet erosion, deposition of dunes is either absent or if present does not exceed what is natural for the site.
- * Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site.

STANDARD 2: STREAMS

Stream channel form and function are characteristic for the soil type, climate and landform.

Meaning that:

Channel gradient, pool frequency, width to depth ratio, roughness, sinuosity and sediment transport are able to function naturally and are characteristic of the soil type, climate and landform.

Criteria to Meet Standard:

- * Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species.
- * Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events.
- * The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter.
- * Portions of the primary floodplain are frequently flooded (inundated every 1-5 years).

STANDARD 3: WATER QUALITY

At a minimum, water quality is adequate for desired beneficial use of water resources on public lands.

Meaning that:

All waters are suitable for original use or desired beneficial use.

Criteria to Meet Standard:

- * (Refer to riparian and wetland and stream criteria)

STANDARD 4: RIPARIAN and WETLAND SITES

Riparian and Wetland areas are in properly functioning condition.

Meaning that:

The riparian and wetland vegetation is controlling erosion, stabilizing stream banks, shading water areas to reduce water temperature, filtering sediment, aiding in floodplain development, dissipating energy, delaying floodwater and increasing recharge of ground water that is characteristic for these sites. Vegetation surrounding seeps and springs is controlling erosion and reflects the potential natural vegetation for the site.

Criteria to Meet Standard:

- * Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines.
- * Riparian vegetation and large woody debris are well anchored and capable of withstanding high stream flow events.
- * Negligible accelerated erosion as a result of human related activities is evident.

- * Age class and structure of woody riparian and wetland vegetation are appropriate for the site.

Exceptions and Exemptions to Standard 4 (where Standard 4 is not applicable)

- * Structural facilities constructed for livestock/wildlife water or other purposes are not natural wetland and/or riparian areas. Examples are: water troughs, stock ponds, flood control structures, tailings ponds, water gaps on fenced or otherwise restricted stream corridors, etc.

STANDARD 5: BIODIVERSITY

Healthy, productive and diverse populations of native plant and animal species, including special status species are maintained.

Meaning that:

Native and other desirable plant and animal populations are diverse, vigorous, able to reproduce, and support nutrient cycles and energy flows.

Criteria to Meet Standard:

- * A variety of age classes are present for most species.
- * Vigor is adequate to maintain desirable levels of plant and animal species to ensure reproduction and recruitment of plants and animals when favorable events occur.
- * Distribution of plant species and their habitats allow for reproduction and recovery from localized catastrophic events.
- * Natural disturbances such as fire are evident, but not catastrophic.
- * Non-native plant and animal species are present at acceptable levels.
- * Habitat areas are sufficient to support viable populations and are connected adequately with other similar habitat areas.
- * Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and maintain soil health.

SUSANVILLE RAC GUIDELINES FOR LIVESTOCK GRAZING

The following guidelines are meant to apply to one or more of the standards for rangeland health.

Guideline 1: A stubble height threshold will be present on all stream-side areas at the end of the growing season, or at the end of the grazing season if grazing occurs after fall dormancy. The residual or regrowth should provide sufficient herbaceous forage biomass to meet the requirement of plant vigor maintenance, bank protection and sediment entrapment.

Utilization of stream-side herbaceous and woody plants should be limited to a specified amount of the current growth, and/or livestock should be removed to allow sufficient time for plant regrowth.

- a. Late season use (summer or fall grazed pastures) requires more restrictive utilization based on site specific situations.
- b. Special situations such as fragile fisheries habitats or easily eroded stream banks may require more restrictive utilization thresholds.
- c. Hoof action impacts or chiseling on stream banks will not exceed specified thresholds so that stream bank stability is maintained or improved.

Guideline 2: Desired seral states will be determined through the Allotment Management Plan development process; generally the goal will be to achieve Potential Natural Communities in the riparian zone.

Guideline 3: Periods of rest from livestock grazing or other avoidable disturbances must be provided during/after periods of stress on the land (e.g: fire, flood, drought) and during critical times of plant growth.

Guideline 4: Plans for grazing on any allotment must consider other uses (recreation, archaeological sites, wildlife, horses and burros, mineral resource extraction, etc.) and be coordinated with the other users of public lands so that overall use does not detract from the goal of achieving rangeland health.

Guideline 5: Intensity, frequency, season-of-use, and distribution of grazing shall provide for growth and reproduction of desired plant species, and the achievement of the potential natural vegetation or desired plant community.

Guideline 6: Grazing permits will include site-specific, measurable terms and conditions.

Guideline 7: Design and work towards implementation of a grazing management strategy for livestock for each grazing unit (pasture) within I (Improvement) and M (Maintenance) category allotments, to maintain or improve rangeland health. This may consist of, but not be limited to, season-of-use, rotation, or by setting utilization levels for desirable plants. Each management plan implemented will incorporate the factors necessary to maintain the health of desirable plants.

Guideline 8: Determination of grazing use by livestock must provide for the habitat requirements of fish and wildlife.

Guideline 9: Grazing management practices must sustain biological diversity across the landscape. A mosaic of seral stages, vegetation corridors, and minimal habitat fragmentation must be maintained.

Guideline 10: Aggressive action to reduce the invasion of undesirable exotic plant species into native plant communities will be taken. The spread of noxious weeds will be controlled through appropriate methods such as grazing management, fire management and other management practices.

Guideline 11: Prescribed fire and (natural) prescribed fire will be utilized to promote a mosaic of healthy plant communities, and vegetative diversity.

Guideline 12: Grazing and other management practices shall take advantage of transitional opportunities (e.g.: drought, flood, fire) to enhance or establish populations of desirable tree, shrub, herbaceous and grass species. Utilization levels will be established for desired seedlings, saplings, and/or mature plants to promote their presence in the plant community.

Guideline 13: Development of springs, seeps and other water related projects shall be designed to promote rangeland health. Wherever possible, water sources shall be available year long for use by wildlife.

Guideline 14: Transitional Guidelines

Due to the extended period of time that will likely be needed to initiate allotment specific analyses for terms and conditions on individual permits, the following guidelines will be applied immediately upon implementation of the Standards and Guidelines. The transitional guidelines represent the minimum necessary guidelines to prevent the most abusive grazing practices from occurring. Range site specific exemptions to the Standards and Guidelines would only be allowed in the most extreme situations (refer to Preamble, paragraph 3). Transitional Guidelines will be appended to the existing land use plans.

- a. Each livestock grazing permit will be modified to include transitional terms and conditions setting maximum allowable use limits, unless objective, measurable utilization standards already are in effect. The following thresholds will be enforced:
 - 1. Riparian (permanently saturated areas or perennial streams)
 - Threshold: Maximum 60% utilization of herbaceous vegetation to be measured by the Landscape Appearance Method.¹
 - Goal: Stability of the vegetative community.
 - Indicator: No net loss of wetlands from livestock trampling.

¹ The Landscape Appearance Method is described in the Interagency Technical Reference for Utilization Studies and Residual Measurements, 1996.

2. Uplands
Threshold: Maximum 50% utilization of perennial or native herbaceous and browse species to be measured by the Landscape Appearance Method.
3. Crucial (Essential) Deer Habitat
Threshold: Maximum 20% utilization of annual growth on key browse species prior to October 1, in identified concentration areas. This will be measured by the Landscape Appearance Method.

- b. Monitoring to determine compliance with utilization levels will be accomplished through a locally determined methodology as directed in the Rangeland Monitoring handbook, MS H-4400-1, California State Office, October 19, 1988; and will be in consultation with permittees and interested publics. Monitoring methods will be simple and easily accomplished. Permittees and others will be able to do the monitoring. BLM will be responsible for monitoring key areas.

Data collection techniques will be agreed upon and cooperatively identified.

- c. The transitional terms and conditions will remain in effect until a current, site-specific analysis is completed.

Guideline 15: Rangeland monitoring to determine utilization of forage resources and trend of rangeland health will be conducted in each allotment based on current accepted practices and techniques. Monitoring methodologies will be applicable to local conditions and developed in consultation with permittees and interested publics.

2.6 ALTERNATIVE 2: STATE-WIDE CONSISTENCY / CONSOLIDATED STANDARDS AND GUIDELINES

STATE-WIDE STANDARDS

STANDARD: SOILS

Soils exhibit characteristics of infiltration, fertility, permeability and other functional physical and biological characteristics that are appropriate to soil type, climate and landform.

Meaning That:

Precipitation is able to enter the soil surface and move through the soil profile at appropriate rates; the soil is adequately protected against accelerated wind or water erosion; the soil fertility is maintained at or moving toward appropriate levels; and the soil is capable of supporting the desired plant community.

As Indicated By:

- * Ground cover (vegetation, litter and other types of ground cover such as rock fragments) is sufficient to protect sites from accelerated erosion.
- * Evidence of wind or water erosion such as rills, gullies, pedestals and sheet or scour erosion or depositional evidence such as alluvial fans or dunes, does not exceed natural rates for the site.
- * Vegetation is vigorous, diverse in species composition and age class, exhibits a variety of rooting depths, and reflects or is moving toward the desired plant community for the site.
- * The physical condition of the soil such as the presence of surface crust, compacted soil layers, or condition of the soil structure is appropriate for the soil type.
- * The occurrence and distribution of a biological crust (referred to as microphytic or cryptogamic) is appropriate for the soil type.

STANDARD: RIPARIAN and WETLAND AREAS:

Riparian² and wetland³ areas will be in properly functioning condition and meeting management goals. Any riparian or wetland areas in functioning-at risk or nonfunctional condition must be in an upward trend.

² As measured at the river reach scale.

³ Measured at the site scale.

Meaning That:

The vegetation, soils, and stream channel morphology interact to maintain natural flow regime, capture and pass sediment, maintain the water table, sustain high water quality, maintain channel type characteristics and promote biodiversity.

Stock ponds, water troughs, and tailing ponds that have been constructed for purposes other than plant or wildlife habitat are not covered by this riparian wetland standard. However, these waters may be managed per objectives contained in land use plans. Since this standard is measured at the river reach scale, small water gaps in fences or otherwise restricted stream reaches need not meet this standard unless it is determined that problems at the water gap are affecting a large portion of the reach.

As Indicated By:

- * Where appropriate, naturally occurring vegetation cover is at a high enough percentage to protect stream banks and dissipate energy during high flows.
- * Age-class and structure of tree and or shrub riparian vegetation is diverse and appropriate for site. Recruitment of preferred species is adequate for sustaining the community.
- * There is minimal cover of invader/shallow rooted species.
- * Point bars are successfully colonized by riparian plant species.
- * Where appropriate, stream channel has a high percentage of canopy cover: resulting in cooler water in summer, reduced icing in winter, and more food for aquatic species.
- * Where appropriate, there is adequate woody debris.
- * Where appropriate, habitat is sufficient to provide for plant and animal riparian dependent species. There is diversity of insects and amphibians.

STANDARD: SPECIES HABITAT

Habitats are maintained or enhanced to support healthy, productive and diverse populations of native plant and animal species in their appropriate habitats, including special status species.

Meaning That:

Native and other desirable plant and animal species are diverse, vigorous, able to reproduce, and support nutrient cycles and energy flows.

As Indicated By:

- * A variety of age classes are present for most plant species.
- * Plant vigor is adequate to maintain desirable plants and ensure reproduction and recruitment of plants when favorable climatic events occur.
- * Distribution of cover of plant species and their habitats allow for reproduction and recovery from localized catastrophic events.
- * Distribution and quality of habitats allow for reproduction and recovery of animal populations from localized catastrophic events.
- * A diversity of plant species with various phenological stages and rooting depths are present on sites, as appropriate.
- * Adequate organic matter (litter and standing plant material) is present for site protection and decomposition to replenish soil nutrients and support nutrient cycling.
- * Where appropriate, biological soil crusts (also called microphytic or cryptogamic soil crusts) are present and are not excessively fragmented.
- * Noxious and invasive species are contained at acceptable levels,
- * Populations of non-native plants and animals are at acceptable levels.
- * Populations of special status species present and other managed species are healthy and in numbers that support long term viability.
- * Habitats are sufficient to support viable populations of special status species present and are connected where possible across the landscape.
- * Natural disturbances, such as fire, are evident but not catastrophic.

STANDARD: WATER QUALITY:

Water will have characteristics suitable for existing or potential beneficial uses.

Meaning That:

There are a number of existing laws, regulations, executive orders, policies, and agreements addressing the protection of water quality. This standard is consistent with all of these, specifically recognizing the authority of the states and Indian tribes in water quality issues within their administrative boundaries. Input by and coordination and consultation with the state water quality agency to define what constitutes compliance for water bodies within the area or activity under consideration is required. Input by and consideration with Indian tribes is required where tribal uses of the water could be effected by BLM management activities. A Management Agency Agreement (MAA) will be developed with the State of California which will make implementation of the above more effective and efficient.

As Indicated By:

- * Achieving water quality monitoring goals identified in BLM's management plans developed in accordance with the 1993 MOU or subsequent agreements including the MAA. These goals may include numeric or narrative criteria for chemical, physical, or biological water quality constituents or physical and biological indicators.

STATE-WIDE GUIDELINES

The guidelines and preambles identified by each RAC for the RAC Standards and Guidelines Proposals (Alternative 1) will remain the same for this alternative except for the following additions and modifications:

Guideline 1: (For all RAC areas) Manage livestock grazing to protect identified sensitive cultural areas.

Guideline 2: The Residual Dry Matter (RDM) to remain after grazing on annual grasslands in both the Bakersfield and Ukiah RAC areas on rangelands with slopes less than 25% and in annual precipitation zones between 10 and 40 inches will be 400 pounds per acre.

TABLE C: Residual Dry Matter (RDM) Guidelines.			
Definition is pounds/acre by slope and precipitation.			
Precipitation	Slope 0-25%	Slope 26-45%	Slope 46% and Up
4" - 10"	200 lbs.	250 lbs.	350 lbs.
10" - 40"	400 lbs.	600 lbs.	800 lbs.
40" - 60"	750 lbs.	1,000 lbs.	1,250 lbs.
60+"	1,000 lbs.	1,500 lbs.	2,000 lbs.

2.6 ALTERNATIVE 3: NO ACTION (FALL-BACK STANDARDS AND GUIDELINES FROM THE REGULATIONS)

In accordance with the regulations published on February 22, 1995 in the Federal Register and identified in part 43 of the Code of Federal Regulations Subpart 4180, the following standards and guidelines will be in effect after February 12, 1997, until such time that State or regional standards and guidelines are developed and in effect.

There is not a "no action" alternative in the strictest interpretation, in that the regulations clearly direct there will be standards and guidelines developed or the fall-back standards and guidelines will be in effect. As there are no existing standards and guidelines for the BLM in California meeting all the fundamentals of rangeland health, the existing situation will change. This alternative will be considered as a no action alternative for analysis purposes, serving as a base for the analysis. The fall-back standards and guidelines were a decision product from the national "Rangeland Reform 94" rulemaking and environmental impact statement.

FALL-BACK STANDARDS

SOILS:

Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and land form.

RIPARIAN / WETLAND:

Riparian-wetland areas are in properly functioning condition.

STREAM FUNCTION:

Stream channel morphology (including but not limited to gradient, width/depth ratio, channel roughness and sinuosity) and functions are appropriate for the climate and land form.

NATIVE SPECIES:

Healthy, productive and diverse populations of native species exist and are maintained.

FALL-BACK GUIDELINES

Guideline 1: Management practices maintain or promote adequate amounts of ground cover to support infiltration, maintain soil moisture, and stabilize soils.

Guideline 2: Management practices maintain or promote soil conditions that support permeability rates that are appropriate to climate and soils.

Guideline 3: Management practices maintain or promote sufficient residual vegetation to maintain, improve, or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability.

Guideline 4: Management practices maintain or promote stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions that are appropriate to climate and landform.

Guideline 5: Management practices maintain or promote the appropriate kinds and amounts of soil organisms, plants and animals to support the hydrologic cycle, nutrient cycle, and energy flow.

Guideline 6: Management practices maintain or promote the physical and biological conditions necessary to sustain native populations and communities.

Guideline 7: Desired species are being allowed to complete seed dissemination in one out of every three years (Management actions will promote the opportunity for seedling establishment when climatic conditions and space allow).

Guideline 8: Conservation of Federal threatened or endangered. Proposed, Category 1 and 2 candidate, and other special status species is promoted by restoration and maintenance of their habitats.

Guideline 9: Native species are emphasized in the support of ecological function.

Guideline 10: Non-native plant species are used only in those situations in which native species are not readily available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.

Guideline 11: Periods of rest from disturbance or livestock use during times of critical plant growth or regrowth are provided when needed to achieve healthy, properly functioning conditions (The timing and duration of use periods shall be determined by the authorized officer).

Guideline 12: Continuous, season-long livestock use is allowed to occur only when it has been demonstrated to be consistent with achieving healthy, properly functioning ecosystems.

Guideline 13: Facilities are located away from riparian-wetland areas wherever they conflict with achieving or maintaining riparian-wetland function.

Guideline 14: The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions and processes of those sites.

Guideline 15: Grazing on designated ephemeral (annual and perennial) rangeland is allowed to occur only if reliable estimates of production have been made, an identified level of annual growth or residue to remain on site at the end of the grazing season has been established, and adverse effects on perennial species are avoided.

2.8 ALTERNATIVE 4:

RAPID IMPROVEMENT / RAPID RECOVERY STANDARDS AND GUIDELINES

Summary

All alternatives analyzed in this EIS involve similar management actions. As required in the regulations, "appropriate action" would be taken "as soon as practicable but not later than the start of the next grazing season" after a problem is known.

Alternative 4, in contrast to the other alternatives, would ensure that any identified problems are corrected as fast as possible rather than taking a gradual, incremental, approach toward improved management. Alternative 4 is designed to promote sharp improvement in trend toward rangeland health within one to three years on favorable sites (e.g. riparian areas or wetlands). Appropriate action could include exclusion of livestock; changes in allowable forage utilization, the season of use, the timing or duration of that use; a combination of these or other actions; or any other management action that would accomplish the goal of properly functioning and healthy rangelands. Depending upon the site's potential, many sites may fully recover within this time period, others may require a longer time period.

As a first step under this alternative, an assessment of every allotment would be undertaken to determine where the standards are not being met. If current livestock grazing practices are resulting in rangeland and riparian areas not meeting one or more of the standards, BLM will adjust livestock grazing before the next grazing season. Monitoring of all allotments would be continued annually, and BLM would make continued adjustments annually if necessary to ensure that trends are sharply upward, and that management is resulting in the most rapid progress possible toward rangeland health.

Livestock grazing would be reestablished in any livestock exclusion areas only when rangeland health is achieved, and can be maintained on a long-term basis with continued livestock grazing. Range improvements such as fencing may be used to correct a small problem but major development projects (due to the logistics of project design, construction, cultural clearances, obtaining funding, etc.) would not be considered as immediate solutions in this alternative.

Some public comments suggested strict quantitative measures for reducing livestock grazing under alternative 4. We have not incorporated those quantitative measures because they would remove appropriate management flexibility of the authorized officer and in some cases would exceed BLM's legal authority.

Implementation of Alternative 4 would require substantial modifications of BLM's rangeland management and other program activities to accommodate an accelerated assessment and increased monitoring commitment and an accelerated schedule for achieving rangeland health. Due to the accelerated nature of the actions in this alternative, we would expect greater short term economic impacts to users than would occur under the other alternatives.

RAPID IMPROVEMENT STANDARDS

The standards for this alternative, except for the Water Quality Standard, are identical to the standards for Alternative 2, the State-wide Alternative. The standards for Soils, Riparian and

Wetland Areas, and Species Habitat are incorporated by reference, and the full text is not repeated here.

STANDARD: WATER QUALITY:

Surface and groundwater quality complies with California or Nevada, and other appropriate (e.g. Tribal) water quality standards.

Meaning That:

Each state designates beneficial uses for water supplies, and has a set of objectives, management practices and/or procedures to be followed to ensure that water quality is sufficient so that the water can be used for the designated purpose. BLM will work with the states to establish appropriate beneficial uses for public waters, and follow the state regulations to ensure that water quality on public lands meets the criteria for the designated beneficial uses of that water.

As Indicated By:

- * Chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, and total dissolved oxygen levels are all within the appropriate range for the beneficial uses.
- * Aquatic organisms and plants (e.g., macroinvertebrates, fish, algae and plants) indicate that conditions are appropriate for the beneficial uses.

RAPID IMPROVEMENT GUIDELINES

The following guidelines contain all of the necessary tools and direction to ensure rapid improvement and recovery of rangelands in at-risk or non-functioning condition. Implementation will follow site-specific analysis and determination of the best method to correct the problem in the shortest length of time.

Guideline 1: If monitoring or verified observation indicates that one or more of the standards is not being met, and if there is evidence that current grazing practices are causing or contributing to this unsatisfactory condition, then grazing management will be adjusted or changed before the following grazing season.

Adjustments shall be designed to show rapid, substantive and measurable progress towards desired ecological conditions. Adjustments shall include, but need not be limited to:

- a. Reductions or changes in season of use in the affected area; or,
- b. Reductions or changes in allowed utilization in the affected area; or,
- c. Reductions or changes in stocking rate (up to and including total livestock exclusion); or
- d. Changes to the grazing system; or
- e. Changes to the class of livestock; or
- f. Any combination of the above.

Changes may include any and all management practices that will accomplish the goals of meeting properly functioning and healthy rangelands, including practices recommended or suggested from new scientific studies that may be developed after these standards and guidelines are adopted. A couple of examples of management practices that may be used are locating salt blocks away from riparian areas, paving water gaps to alleviate or prevent erosion, or locating handling facilities away from riparian areas.

Guideline 2: If monitoring or verified observation indicates that one or more of the standards is not being met, and if there is evidence that current grazing practices are causing or contributing to this unsatisfactory condition, then the following utilization limits recommended by Holechek (Holechek, et al, 1995, pg 195-198) for utilization of key herbaceous species will be applied.

Adjustments (more or less restrictive) to these limits may be made based upon monitoring, and the desired resource conditions. These desired resource conditions should be documented in an AMP or comparable plan. Downward adjustments to these limits may be made if monitoring indicates that significant progress is not being made toward meeting one or more of the standards.

Table D: UTILIZATION GUIDELINES	
Community Type	Percent Use of Key Herbaceous Species*
Salt desert shrubland	25 - 35
Semi-desert grass and shrubland	30 - 40
Sagebrush grassland	30 - 40
California annual grassland	50 - 60
Coniferous forest	30 - 40
Mountain shrubland	30 - 40
Oak woodland	30 - 40
Pinyon-juniper woodland	30 - 40
Alpine tundra	20 - 30

* Ranges in good condition and/or grazed during the dormant season can withstand the higher utilization level. Those in poor condition or grazed during active growth should receive the lower utilization level.

Note: Percent utilization can be converted to approximate minimum allowed stubble heights or residual dry matter by using average values for height and dry weight of key species (see Kinney and Clary, 1991; or Clary and Webster, 1989, for example).

Guideline 3: When implementing guidelines 1 and 2, adequate amounts of vegetative ground cover, including standing plant material and litter, will be maintained or promoted to support infiltration, maintain soil moisture storage, and stabilize soils.

Residual Dry Matter (RDM) to remain on annual grasslands after grazing is shown on Table E.

TABLE E: Residual Dry Matter (RDM) Guidelines. Definition is pounds/acre by slope and precipitation.			
Precipitation	Slope 0-25%	Slope 26-45%	Slope 46% and Up
4" - 10"	200 lbs.	250 lbs.	350 lbs.
10" - 40"	400 lbs.	600 lbs.	800 lbs.
40" - 60"	750 lbs.	1,000 lbs.	1,250 lbs.
60+"	1,000 lbs.	1,500 lbs.	2,000 lbs.

Guideline 4: When implementing guidelines 1 and 2, subsurface soil conditions will be maintained or promoted that support permeability rates appropriate to climate or soils.

Guideline 5: When implementing guidelines 1 and 2, riparian / wetland functions including energy dissipation, sediment capture, groundwater recharge, and stream bank stability will be maintained, improved, and restored.

Guideline 6: A 4-6 inch minimum stubble height will remain at the end of the grazing season in most riparian areas. Minimum stubble heights greater than 6 inches will be set for critical fisheries, easily eroded streambanks, or unhealthy riparian areas (those not fully meeting standards, or those "functioning at risk").

Adjustments (more or less restrictive) to these limits may be made based upon monitoring, and the desired resource conditions. These desired resource conditions should be documented in an AMP or comparable plan. Increases to the minimum stubble height may be made if monitoring indicates that significant progress is not being made toward meeting one or more of the standards.

Guideline 7: When implementing guidelines 1, 2 and 6, stream channel morphology (e.g. gradient, width / depth ratio, channel roughness and sinuosity) and functions appropriate to the climate and landform will be maintained and promoted.

Guideline 8: When implementing guidelines 1 and 2, the appropriate kinds and amounts of soil organisms, plants and animals to support the hydrologic cycle, nutrient cycle, and energy flow will be maintained or promoted.

Guideline 9: When implementing guidelines 1 and 2, the opportunity for seedling establishment of appropriate plant species will be promoted when climatic conditions and space allow it. Additionally, opportunistic management will be employed. After exceptionally wet or dry years, or following fire, flood or other extraordinary events, livestock grazing may be reduced or eliminated in order to avoid interfering with recruitment of species which germinate or sprout in response to such events, or are unusually sensitive to damage from such events.

Guideline 10: When implementing guidelines 1 and 2, water quality will be maintained or enhanced to meet management objectives, such as meeting wildlife needs.

Guideline 11: When implementing guidelines 1 and 2, habitats will be maintained, enhanced or restored to meet the needs of, and promote the conservation of, Federal threatened or endangered, Proposed, Category 1 and 2 candidate, and other special status species.

Guideline 12: When implementing guidelines 1 and 2, the physical and biological conditions necessary to sustain native populations and communities of plants and animals will be maintained or promoted.

Guideline 13: Aggressive action will be taken to discourage the spread and infestation of weeds by livestock, such as the use of weed-free hay, livestock purging periods (Sheley 1995), and appropriate grazing management.

Guideline 14: When implementing guidelines 1 and 2, native species will be emphasized in the support of ecological function.

Guideline 15: When implementing guidelines 1 and 2, non-native species will be utilized only in those situations in which locally-collected native species are not available in sufficient quantities, or are incapable of maintaining or achieving properly functioning conditions and biological health.

2.9 ALTERNATIVE 5: PREFERRED ALTERNATIVE -- MODIFIED STANDARDS & GUIDELINES PROPOSED BY THE RESOURCE ADVISORY COUNCILS

This alternative includes three sets of proposed rangeland standards and guidelines, one for each of the RAC areas -- Bakersfield, Ukiah and Susanville. It is similar to Alternative 1, but has been modified by the RACs and BLM to reflect public comment and suggestions, BLM review and suggestion, and further RAC consideration following the draft EIS. Prior to the preamble for each set of standards and guidelines is a short listing of what changes have been made in Alternative 5 from Alternative 1.

2.91 BAKERSFIELD RAC RECOMMENDED STANDARDS AND GUIDELINES (Modified)

Changes

In the preamble the paragraph pertaining to DPCs being a measure of meeting the standards was removed. DPCs are management goals developed through land use plans, and should not be a measure of meeting the standards.

Within the Species standard, the word "viable" was added to the beginning of the standard for clarification.

Within the Species standard, the words "and desired" were added, based upon public comment.

Under the Species standard, the paragraph pertaining to DPCs in the Indicator section was deleted. It was felt that DPCs are a management goal developed through the land use plan, and should not be a measure of meeting the standards.

Within the Riparian standard, the phrase "or are making significant progress toward" was deleted. The regulations state that standards must be met, or significant progress must be made toward meeting the standards. A standard must be a set goal, and it is inappropriate within a standard to use that phrasing.

Within the Riparian standard, the phrase "achieving an advanced ecological status" was deleted and replaced with "meeting regional and local management objectives." This was done because there are times that an advanced ecological status may not be the goal.

Within the Riparian standard, under physical indicators, the reference to Rosgen's classification system was deleted. The intent is to use that system initially, but to be able to use any new system that is developed if it is appropriate, without having to modify the standard.

The Water Quality standard was amended slightly to conform with the suggestions of the State Water Resources Control Board.

Original Guideline 5 was moved to be guideline 3. Guideline 3 became 4, and 4 became 5.

Guideline 5 was amended by adding a paragraph to explain how utilization levels will be implemented. This is from a suggestion by Holechek, modified by BLM, and discussed at the workshop with the RAC representatives.

A new Guideline 9 was added to discuss utilization of browse species in deer concentration areas. This was a suggestion from the public, and taken from a guideline originally developed by the Susanville RAC.

Guideline 12 (was 11) was amended like #5, by adding a paragraph to explain how utilization levels will be implemented.

Table A was amended to include references to Coniferous Forest and Mountain Shrubland, Alpine Tundra and Salt Desert Shrubland.

Guideline 17 (was 16) for water quality, was amended by the addition of two statements suggested by the State Water Resources Control Board.

Guideline 18 was added to discuss coordination with other uses. This was a suggestion from the public, and is identical to a guideline developed by the Ukiah RAC.

Standards and Guidelines for Rangeland Health in The Bakersfield District

Preamble

The standards for rangeland health and guidelines for livestock management on Bureau of Land Management lands are written to accomplish the four fundamentals of rangeland health, insofar as the standards are affected by livestock grazing practices. Those fundamentals are:

- A. Watersheds are properly functioning;
- B. Ecological processes are in order;
- C. Water Quality complies with State standards; and,
- D. Habitats of protected species are in order.

A "standard" serves as the criterion to determine if management actions are resulting in the maintenance or attainment of healthy rangelands per the four fundamentals of rangeland health. Standards are expressions of physical and biological conditions or degree of function required for healthy, sustainable rangelands. "Guidelines" serve as the vehicle to implement management actions related to livestock grazing to accomplish rangeland health standards. Guidelines will indicate the types of grazing methods and practices determined to be appropriate to ensure that standards can be met. The public should be an active participant in the application of these standards and guidelines.

Standards and guidelines will apply to all BLM lands within the geographic area for which they are written. Using the complete set of standards and guidelines, the local BLM range managers, in consultation with grazing permittees and other interested parties, will determine "terms and conditions" for each grazing allotment. These terms and conditions are the specific grazing practices that are appropriate for that allotment.

BLM lands vary so greatly in topography, climate, soils, water availability, size and distribution of parcels, and other factors, that local managers must have the flexibility needed to determine which grazing practices will work best in each area, and to change those practices when necessary to achieve the desired rangeland conditions.

The scientific evidence and collective knowledge of the public and rangeland managers show a wide variety of grazing effects on plants, animals and watersheds. As a result, the application of these standards and guidelines will emphasize using the best available information for a site-specific situation, and the results of historical grazing patterns should be given significant weight in any decisions about grazing practices to be followed on BLM allotments. Where historical grazing use has been compatible with meeting the standards for soils, species, riparian areas or water quality, no permanent changes should be mandated in the existing grazing patterns without substantial scientific evidence that changing the existing grazing pattern will improve the ability to achieve the standards.

For any standard, guideline, term, or condition to work, it must be capable of being achieved, based on sound science or good common sense, and be measurable, understandable, and economically feasible. There is no use in setting standards that can not be met.

Successful application of these standards and guidelines will depend on BLM's capability to monitor rangeland conditions and implement management practices. Each Bureau office should develop a monitoring and implementation plan that sets priorities based on resource conditions, trends, and resource values.

BAKERSFIELD STANDARDS FOR RANGELAND HEALTH

STANDARD: SOILS

Soils exhibit functional biological and physical characteristics that are appropriate to soil type, climate, and land form.

Meaning That:

Precipitation is able to enter the soil surface at appropriate rates; the soil is adequately protected against accelerated erosion; and the soil fertility is maintained at appropriate levels.

As Indicated By:

- * Ground cover (vegetation and other types of ground cover such as rock) is sufficient to protect sites from accelerated erosion.
- * Litter/residual dry matter is evident, in sufficient amounts to protect the soil surface.
- * A diversity of plant species, with a variety of root depths, is present and plants are vigorous during the growing season.

- * There is minimal evidence of accelerated erosion in the form of rills, gullies, pedestaling of plants or rocks, flow patterns, physical soil crusts/surface sealing, or compaction layers below the soil surface
- * Biological (microphytic or cryptogamic) soil crusts are in place where appropriate.

STANDARD: SPECIES

Viable, healthy, productive, and diverse populations of native and desired species, including special status species (Federal T&E, Federal proposed, Federal candidates, BLM sensitive, or Calif. State T&E) are maintained or enhanced where appropriate.

Meaning That:

Native and other desirable plant and animals are diverse, vigorous, able to reproduce and support the hydrologic cycle, nutrient cycles, and energy flows over space and time.

As Indicated By:

- * Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations.
- * A variety of age classes are present for most perennial plant species.
- * Plant vigor is adequate to maintain desirable plants and ensure reproduction and recruitment of plants when favorable climatic events occur.
- * The spatial distribution and cover of plant species and their habitats allows for reproduction and recovery from localized catastrophic events.
- * A diversity of plant species with various phenological stages and rooting depths are present on sites where appropriate.
- * Appropriate natural disturbances are evident.
- * Levels of non-native plants and animals are at acceptable levels.
- * Special status species present are healthy and in numbers that appear to ensure stable to increasing populations; habitat areas are large enough to support viable populations or are connected adequately with other similar habitat areas.
- * Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients.

- * Where appropriate, biological soil crusts (also called microphytic or cryptogamic soil crusts) are present and not excessively fragmented.
- * Noxious and invasive species are contained at acceptable levels.

STANDARD: RIPARIAN

Riparian/wetland vegetation, structure and diversity, and stream channels and floodplains are functioning properly, and meeting regional and local management objectives.

Meaning That:

The vegetation and soils interact to capture and pass sediment, sustain infiltration, maintain the water table, stabilize the channel, sustain high water quality, and promote biodiversity appropriate to soils, climate, and landform.

As Indicated By:

Vegetation Attributes:

- * Vegetation cover is greater than 80% or the percentage that will protect banks and dissipate energy during high flows.
- * Age-class and structure of woody/riparian vegetation are diverse and appropriate for the site.
- * Where appropriate, shading is sufficient to provide adequate thermal regulation for fish and other riparian dependent species.
- * Where appropriate, there is adequate woody debris.
- * A diversity of plant species with various phenological stages and rooting depths is present. Root masses are sufficient to stabilize stream banks and shorelines.
- * Plant species present indicate that soil moisture characteristics are being maintained.
- * There is minimal cover of invader/shallow-rooted species.
- * Adequate organic matter (litter and standing dead plant material) is present to protect the site and to replenish soil nutrients through decomposition.
- * Point bars are vegetated.

Physical Indicators:

- * Streambank stability, pool frequency, substrate sediments, stream width, and bank angles are appropriate for the stream type.

STANDARD: WATER QUALITY

Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California State standards.

Management Objective: For water bodies, the primary objective is to maintain the existing quality and beneficial uses of water, protect them where they are threatened (and livestock grazing activities are a contributing factor), and restore them where they are currently degraded (and livestock grazing activities are a contributing factor). This objective is of even higher priority in the following situations:

- (a) where beneficial uses of water bodies have been listed as threatened or impaired pursuant to Section 303(d) of the Federal Clean Water Act;
- (b) where aquatic habitat is present or has been present for Federal threatened or endangered, candidate, and other special status species dependent on water resources; and,
- (c) in designated water resource sensitive areas such as riparian and wetland areas.

Meaning That:

BLM will, pursuant to the Clean Water Act:

Maintain the physical, biological, and chemical integrity of waters flowing across or underlying the lands it administers;

Protect the integrity of these waters where it is currently threatened;

Insofar as is feasible, restore the integrity of these waters where it is currently impaired;

Not contribute to pollution and immediately remedy any pollution resulting from its actions that violates applicable California (including the requirements identified in Regional Basin Plans), or Tribal water quality standards or other applicable water quality requirements (e.g., requirements adopted by SWRCB or RWQCB in California, or US EPA pursuant to Section 303(d) of the Clean Water Act or the Coastal Zone Reauthorization Act).

Be consistent with the non-degradation policies identified in the Regional Basin Plans in California.

Work with the State (including the Regional Water Quality Control Boards) and USEPA to establish appropriate beneficial uses for public waters, establish appropriate numeric

targets for 303(d)-listed water bodies, and implement the applicable requirements to ensure that water quality on public lands meets the criteria for the designated beneficial uses of the water.

Reasonably implement Best Management Practices (BMPs) approved by the SWRCB to protect and restore the quality and beneficial uses of water, and monitor both implementation and effectiveness of the BMPs.

As Indicated By:

- * The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen.
- * Achievement of the standards for riparian, wetlands, and water bodies.
- * Aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants) indicate support for beneficial uses.
- * Acceptable results from implementation and effectiveness monitoring or changes in management to address deficiencies identified by such monitoring.

Exceptions:

Impoundments (stock ponds) and troughs that have a sustained discharge yield of less than 200 gallons per day to surface or groundwater are excepted from meeting State drinking water standards per SWRCB Resolution No. 88-63.

BAKERSFIELD RAC GUIDELINES FOR GRAZING MANAGEMENT:

Guideline 1: Livestock grazing operations will be conducted so that progress is made toward maintaining or promoting adequate amounts of vegetative ground cover, including standing plant material and litter to support infiltration, permeability, and maintain soil moisture storage and soil stability appropriate for the ecological sites within the management units. The ground cover should maintain soil organisms, plants, and animals to support the hydrologic and nutrient cycles, and energy flow.

Guideline 2: Implement grazing systems that regulate the timing and intensity of grazing. Continuous season-long grazing use is allowed if it has been demonstrated that it can be consistent with achieving a healthy, properly functioning ecosystem. Grazing systems should specify season of use based on plant phenology and geohydrologic processes where appropriate. On annual rangelands, mulch management should be used to define target forage use levels that will ensure that sufficient amounts of residual dry matter (RDM) or standing plant material will be maintained throughout the grazing season. Mulch levels for annual grasses should meet the requirements of Table A, whenever feasible. Mulch levels will include a "buffer" to account for RDM loss from other natural processes (decomposition, animal use, etc.). Exceptions may be approved during the green season when substantial regrowth is

expected or if lower RDM levels are required to meet particular rangeland health objectives, such as reducing competition for a desired species.

Guideline 3: On Annual Range, readiness will be determined by: 1) Minimum RDM levels at the time of turnout prior to green season growth are exceeded by 200 pounds per acre; or 2) Minimum RDM levels and at least 2 inches of new growth are present in the growing season.

Guideline 4: Where appropriate, use grazing systems that maintain the presence and distribution of microsites for seed germination.

Guideline 5: Perennial plant utilization should be limited to appropriate levels of the current year's growth as indicated in Table A, unless it has been proven that this level of use is incompatible with the continued existence of the plant.

Management changes will be implemented (e.g., reductions in stocking rate or another management change) if utilization guidelines on the average of the upland key areas across the pasture (or allotment if there is only one pasture) are exceeded for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70% of upland key areas on the pasture (or allotment) are not to exceed maximum utilization guidelines in most years. Because of the potential long-term damage to perennial grass species associated with severe grazing, severe grazing use (>70% utilization) in any upland key area in any year will result in a management change the following year. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents. The average (mean) utilization on key species will be estimated at each key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 for further discussion on this issue.

For allotments not meeting or making significant progress toward meeting the standards (and for which lower utilization levels of perennial upland species would be expected to help move these allotments toward the standards), utilization data already in hand will be used to determine whether a management change is necessary. Thus, for example, if utilization on a particular key area has exceeded the thresholds of Table A for the two years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are expected to bring utilization levels within threshold values, close monitoring will follow to ensure the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

Guideline 6: Implement grazing systems that permit existing native species to complete entire life cycles and sustain the spatial distribution of microsites necessary for seed germination at intervals sufficient to maintain the viability of the species.

Guideline 7: Use grazing systems that are compatible with the persistence of desired species. Grazing use should provide appropriate levels of plant matter that will promote the existence of desirable plants and animals.

Guideline 8: Native species are recommended for all revegetation and enhancement projects unless they are not readily available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.

Guideline 9: Within identified deer concentration areas there will be no more than 20 percent utilization of annual growth on key browse species prior to October 1.

Guideline 10: Periods of rest from livestock grazing or other avoidable disturbances should be provided during/after episodic events (e.g., flood, fire, drought) and during critical times of plant growth needed to achieve proper functioning conditions, recovery of vegetation, or desired plant community.

Guideline 11: Grazing management practices will allow for the reproduction of species that will maintain riparian-wetland functions, including energy dissipation, sediment capture, groundwater recharge, streambank stability, the hydrologic cycle, nutrient cycle, and energy flow.

Guideline 12: Grazing practice should maintain a minimum herbage stubble height on all stream-side, riparian and wetland areas at the end of the growing season. There should be sufficient residual stubble or regrowth at the end of the growing season to meet the requirements of plant vigor maintenance, bank protection, and sediment entrapment (Table A).

Management changes will be implemented (e.g., reductions in stocking rate or another management change) if stubble heights on the average of the key riparian areas across the pasture (or allotment if there is only one pasture) fall below the guidelines for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70% of riparian key areas on the allotment are to exceed minimum stubble heights in most years. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents. Because stream banks may be inadequately protected by heavy use in any one year and because stubble heights below 3 inches result in cattle shifting their preference to shrubs, stubble heights below 2 inches in any one year will require a management change in the following year.

The mean stubble height on key riparian species will be estimated at each riparian key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 for further discussion on this issue.

For allotments not meeting or making significant progress toward meeting the standards (and for which higher stubble would be expected to help move these allotments toward the standards), stubble height data already in hand will be used to determine whether a management change is necessary. Thus, for example, if stubble heights on a particular key area have fallen below the thresholds of Table A for the two years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are

Table A: Forage Utilization and Mulch Management Requirements				
Precipitation	Plant Community	Slope, Elevation	Minimum Residual Dry Matter* (lbs/ac)	Maximum Utilization of Key Perennials, #, ##
4-10 Inches	California annual grassland	<25% 25-45% >45%	200 250 350	25-40%
10-40 Inches	California annual grassland, Oak woodlands	<25% 25-45% >45% <15%, 1000-2500' >15%, >2500'	400 600 800 700-900** 1000-1200**	30-45%
8-30 Inches	Sagebrush grassland, semi-desert grass and shrubland, Pinyon-juniper woodland, Cool season pasture	NA	NA	30-40%
	Coniferous forest, mountain shrubland	NA	NA	30-40%
	Alpine tundra	NA	NA	20-30%
	Salt Desert Shrubland	NA	NA	25-35%
4-40 Inches	Riparian areas, wetlands	NA	4-6 inch stubble height #	35-45% herbs, 10-20% shrubs, 0-20% trees

* Minimum to be present at fall green/winter green-up.

** Higher minimum is for sites that are: in unsatisfactory condition, grazed during active growth, not rested, or on steeper slopes.

Stubble height and percent utilization levels are initial values that should be adjusted to consider timing of grazing use and plant phenology, resource conditions and a site's resiliency at the allotment, pasture or site-specific location. Perennial plant utilization levels and stubble heights are based on a literature review by Holechek (1991) and Willoughby (see the Annotated Bibliography on Utilization).

On sites in unsatisfactory condition and/or trend, perennial plant utilization should be no more than 15-25% current annual growth where less than one period of rest is provided per growing season of use.

expected to bring stubble heights within threshold values, close monitoring will follow to ensure the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

Guideline 13: Water sources, wetlands and riparian areas may be fenced to reduce impacts from livestock.

Guideline 14: The development of water sources will maintain ecologic and hydrologic function and processes.

Guideline 15: Locate salt blocks and other supplemental feed well away from riparian/wetland areas.

Guideline 16: Locate new livestock handling and/or management facilities outside of riparian/wetland areas. For existing livestock handling facilities inside riparian areas, ensure that facilities do not prevent attainment of standards. Limit livestock trailing, bedding, watering, loading, and other handling efforts to those areas and times that will not retard or prevent attainment of standards.

Guideline 17: Implement grazing systems that will promote compliance with the Water Quality Standards.

a. Apply the management practices recognized and approved by the State of California as Best Management Practices (BMPs) for grazing related activities to protect and maintain water quality.

b. In watersheds draining into water bodies that have been listed or are proposed for listing as having threatened or impaired beneficial uses, and where grazing activities may contribute to the pollutants causing such impairment, the management objective is to fully protect, enhance, and restore the beneficial uses of the water.

Guideline 18: The plan for grazing on any allotment must consider other uses (recreation, wildlife, mineral resource development, etc.) and be coordinated with other users of the public lands so that overall use does not detract from the goal of achieving rangeland health.

2.92 UKIAH RAC RECOMMENDED STANDARDS AND GUIDELINES (Modified)

Changes

In the preamble the paragraph pertaining to DPCs being a measure of meeting the standards was removed. DPCs are management goals developed through land use plans, and should not be a measure of meeting the standards.

Within the Species standard, the word "viable" was added to the beginning of the standard for clarification.

Within the Species standard, the words "and desired" were added, based upon public comment.

Under the Species standard, the paragraph pertaining to DPCs in the Indicator section was deleted. It was felt that DPCs are a management goal developed through the land use plan, and should not be a measure of meeting the standards.

Within the Riparian standard, the phrase "or are making significant progress toward" was deleted. The regulations state that standards must be met, or significant progress must be made toward meeting the standards. A standard must be a set goal, and it is inappropriate within a standard to use that phrasing.

Within the Riparian standard, the phrase "achieving late seral stages" was deleted and replaced with "meeting regional and local management objectives." This was done because there are times that an advanced ecological status or late seral stage may not be the goal.

The Water Quality standard was amended to conform with the suggestions of the State Water Resources Control Board. The exceptions as written were a violation of law; and new wording was provided for the Meaning section, Indicators section, and Exceptions.

Guideline 2 was amended by adding statements on stubble height, utilization of trees and shrubs, and how the utilization will be implemented. This was suggested by Holechek and other members of the public, modified by BLM, and discussed at the workshop with the RAC representatives.

Guideline 7 was moved to number 3; and numbers 3-6 all moved down one number.

Guideline 24 was added to discuss utilization of perennial grasslands, based upon information from Holechek, modified by BLM, and discussed at the workshop with the RAC representatives.

Guideline 25 was added to discuss utilization of browse species. This was a suggestion from the public, and taken from a guideline originally developed by the Susanville RAC.

Guidelines 26 and 27 were added at the suggestion of the State Water Resources Control Board to help with water quality.

Standards and Guidelines for Rangeland Health in The Ukiah District

Preamble

The standards for rangeland health and guidelines for livestock grazing on BLM administered lands are written to accomplish the four fundamentals of rangeland health, insofar as they are affected by livestock grazing practices. These fundamentals are:

- A. Watersheds are properly functioning;
- B. Ecological processes are in order;
- C. Water quality complies with state standards; and,
- D. Habitats of protected species are in order.

Additionally, the standards and guidelines must be consistent with those of adopted regional conservation strategies which affect the Northwestern California public lands under the purview of the Ukiah Resource Advisory Council. The Northwest Forest Plan (NFP; USDI and USDA 1994) encompasses the entire range of the northern spotted owl and provides a set of land allocations and standards and guidelines for management activities. It contains both terrestrial and aquatic conservation strategies. Range management standards and guidelines are directed toward attainment of aquatic conservation strategy objectives through management of riparian reserves. The Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH; USDI and USDA 1995) extends riparian standards and guidelines as in the NFP to all anadromous watersheds beyond the range of the northern spotted owl.

The RAC and BLM staff reviewed these standards and guidelines during development of the Standards for Rangeland Health and Guidelines for Livestock Grazing to ensure that the Aquatic Conservation Strategy objectives of the NFP and Riparian Management Objectives of PACFISH were consistent, and that the standards and guidelines were consistent with the BLM's Redding and Arcata Resource Management Plans.

A "standard" serves as the criterion to determine if management actions are resulting in the maintenance or attainment of healthy rangelands per the four fundamentals of rangeland health. Standards are expressions of physical and biological conditions or degree of function required for healthy sustainable rangelands. Guidelines serve as the vehicle to implement management actions related to livestock grazing to accomplish the rangeland health standards. Guidelines will indicate the types of grazing methods and practices determined to be appropriate to ensure that the standards can be met.

Standards and guidelines will apply to all BLM lands within the geographic area for which they are written. Using the standards and guidelines, the local BLM managers, in consultation with grazing permittees and other interested parties, will determine terms and conditions for each grazing allotment. These terms and conditions are the specific grazing practices that are appropriate for that allotment.

BLM lands vary so greatly in topography, climate, soils, water availability, size and distribution of parcels, and other factors that the local managers must have the flexibility needed to determine which grazing practices will work best in each area, and to change those practices when necessary to achieve the desired rangeland conditions.

Where historical grazing has been compatible with meeting the standards for soils, species, riparian areas or water quality, no permanent changes should be mandated in the existing grazing patterns without substantial scientific evidence that changing the grazing pattern will improve the ability to achieve the standards.

For any standard, guideline, term, or condition to work, it must be capable of being achieved, based on sound science or good common sense, and be measurable, understandable, and economically feasible. There is no use in setting standards that cannot be met.

UKIAH STANDARDS FOR HEALTHY RANGELANDS

STANDARD: SOILS

Soils exhibit characteristics of infiltration, fertility, permeability rates, and other functional biological and physical characteristics that are appropriate to soil type, climate, desired plant community, and land form.

Meaning That:

Precipitation is able to enter the soil surface at appropriate rates; the soil is adequately protected against accelerated erosion; and the soil fertility is maintained at appropriate levels.

As Indicated By:

- * Ground cover (vegetation and other types of ground cover such as rock) sufficient to protect sites from accelerated erosion.
- * Litter/residual dry matter evident, accumulating in place, and showing negligible movement by water.
- * A diversity of plant species, including native plants, with a variety of root depths, is present and plants are vigorous during the growing season (Rangeland Health, National Research Council, 1994, page 130, table 4-8).
- * There is minimal evidence of accelerated erosion in the form of rills, gullies, pedestaling of plants or rocks, flow patterns, physical soil crusts/surface sealing, or compaction layers below the soil surface.
- * Biological (microphytic or cryptogamic) soil crusts, if present, are intact.

STANDARD: SPECIES

Viable, healthy, productive, and diverse populations of native and desired plant and animal species, particularly special status species, are maintained and/or being restored.

Meaning That:

As Stated.

As Indicated By:

- * Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations.
- * A variety of age classes is present for desired plant species (Rangeland Health, National Research Council 1994, page 130 table 4-8).
- * Plant vigor is adequate to maintain desirable plants and ensure reproduction and recruitment of plants when favorable climatic events occur.
- * The spatial distribution of plant and animal species and their habitats allows for reproduction and recovery from localized catastrophic events.
- * A diversity of plant species with various developmental stages and rooting depths is present to extend the photosynthetic period and increase energy capture.
- * There is evidence of beneficial natural disturbances.
- * Non-native, noxious, and invasive species are at acceptable levels.
- * Special status species and other local species of concern are healthy and in numbers that appear to ensure stable to increasing populations; habitat areas are large enough to support viable populations or are connected adequately with other similar habitat areas.
- * Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and support nutrient cycling.
- * Where appropriate, biological soil crusts (also called microphytic or cryptogamic soil crusts) are present and not excessively fragmented.

STANDARD: RIPARIAN

Riparian/wetland vegetation, structure and diversity, and stream channels and floodplains are functioning properly, and meeting regional and local management objectives.

Meaning That:

The vegetation and soils interact to capture and pass sediment, sustain infiltration, maintain the water table, stabilize the channel, sustain high water quality, and promote biodiversity appropriate to soils, climate, and landform.

As Indicated By:

- * Naturally occurring vegetation cover will protect banks and dissipate energy during high flows.

- * Age-class and structure of woody/riparian vegetation are diverse and appropriate for the site. Recruitment of preferred species is adequate for sustaining the community.
- * Where appropriate, habitat is sufficient to provide for plant and animal riparian-dependent species. There is diversity and abundance of insects and amphibians.
- * Where appropriate, there is adequate woody debris.
- * A diversity of plant species with various developmental stages and rooting depths is present (Rangeland Health, National Research Council 1994, page 112, and table 4-8 on page 130). Root masses are sufficient to stabilize stream banks and shorelines.
- * Plant species present indicate that soil moisture characteristics are being maintained.
- * Shallow-rooted, invader plant species are not displacing native species.
- * Adequate organic matter (litter and standing dead plant material) is present to protect the site and to replenish soil nutrients through decomposition (Rangeland Health, National Research Council 1994, page 130, table 4-8).
- * Point bars are becoming vegetated over time.
- * There is adequate stream bank stability, morphology, pool frequency, stream width depth ratio, and minimal substrate sediments and bare ground.

Exceptions and exemptions from the riparian standard, where the standard may not be applicable:

Structural facilities constructed for livestock/wildlife water or other purposes which are not natural wetland and/or riparian areas will be excepted. Examples are: water troughs, stockponds, flood control structures, tailings ponds, water gaps on fenced or otherwise restricted stream corridors, etc.

STANDARD: WATER QUALITY

Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California State standards.

Management Objective: For water bodies, the primary objective is to maintain the existing quality and beneficial uses of water, protect them where they are threatened (and livestock grazing activities are a contributing factor) and restore them where they are currently degraded (and livestock grazing activities are a contributing factor). This objective is of even higher priority in the following situations:

- (a) where beneficial uses of water bodies have been listed as threatened or impaired pursuant to Section 303(d) of the Federal Clean Water Act;

(b) where aquatic habitat is present or has been present for Federal threatened or endangered, candidate, and other special status species dependent on water resources; and,

(c) in designated water resource sensitive areas such as riparian and wetland areas.

Meaning That:

BLM will, pursuant to the Clean Water Act:

Maintain the physical, biological, and chemical integrity of waters flowing across or underlying the lands it administers;

Protect the integrity of these waters where it is currently threatened;

Insofar as is feasible, restore the integrity of these waters where it is currently impaired;

Not contribute to pollution and immediately remedy any pollution resulting from its actions that violates applicable California water quality standards (including the requirements identified in Regional Basin Plans), or Tribal water quality standards, or other applicable water quality requirements (e.g., requirements adopted by SWRCB or RWQCB in California, or US EPA pursuant to Section 303(d) of the Clean Water Act or the Coastal Zone Reauthorization Act).

Be consistent with the non-degradation policies identified in the Regional Basin Plans in California.

Work with the State (including the Regional Water Quality Control Boards) and USEPA to establish appropriate beneficial uses for public waters, establish appropriate numeric targets for 303(d)-listed water bodies, and implement the applicable requirements to ensure that water quality on public lands meets the criteria for the designated beneficial uses of the water.

Reasonably implement Best Management Practices (BMPs) approved by the SWRCB to protect and restore the quality and beneficial uses of water, and monitor both implementation and effectiveness of the BMPs.

As Indicated By:

- * The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen.
- * Achievement of the standards for riparian, wetlands, and water bodies.
- * Aquatic organisms and plants (e.g., macroinvertebrates, fish, algae and plants) indicate support for beneficial uses.
- * Acceptable results from implementation and effectiveness monitoring or changes in management to address deficiencies identified by such monitoring.

Exceptions:

Impoundments (stock ponds) and troughs that have a sustained discharge yield of less than 200 gallons per day to surface or groundwater are excepted from meeting drinking water requirements per SWRCB Resolution No. 88-63.

UKIAH GUIDELINES FOR LIVESTOCK MANAGEMENT**RIPARIAN HABITATS**

Guideline 1: Management for riparian-dependent special status species, where they occur, is primary.

Guideline 2: Season of use should be short term and allow for plant regrowth and reproduction. The residual or regrowth should provide sufficient herbaceous forage biomass to meet the requirements of plant vigor maintenance, plant and wildlife habitat, stream shading, bank protection and sediment entrapment. Specific grazing dates will be set in lease terms and conditions.

A 4-6 inch minimum stubble height will remain at the end of the growing season in most riparian areas.

There should be no more than 20% utilization on key riparian tree and shrub species in those areas where the presence of woody riparian species is necessary to meet standards.

Management changes will be implemented (e.g., reductions in stocking rate or another management change) if stubble heights on the average of the key riparian areas across the pasture (or allotment if there is only one pasture) fall below the guidelines for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70% of riparian key areas on the allotment are to exceed minimum stubble heights in most years. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents. Because stream banks may be inadequately protected by heavy use in any one year and because stubble heights below 3 inches result in cattle shifting their preference to shrubs, stubble heights below 2 inches in any one year will require a management change in the following year.

The mean stubble height on key riparian species will be estimated at each riparian key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 for further discussion on this issue.

For allotments not meeting or making significant progress toward meeting the standards (and for which higher stubble would be expected to help move these allotments toward the standards), stubble height data already in hand will be used to determine whether a management change is necessary. Thus, for example, if stubble heights on a particular key area have fallen below the thresholds for the two years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are

expected to bring stubble heights within threshold values, close monitoring will follow to ensure the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

Guideline 3: Degraded riparian areas may require complete rest or other change in management practices to initiate the recovery process.

Guideline 4: Locate salt blocks and supplemental feed well away from riparian zones.

Guideline 5: Locate all livestock handling and management facilities outside of riparian areas.

Guideline 6: Limit livestock trailing and watering to those areas and times that will not retard or prevent attainment of standards. Avoid trailing in vernal pools and wetlands whenever possible.

Guideline 7: Make temporary changes to livestock grazing management practices, including increases or decreases in stocking rates and seasons of use, in response to important episodic events (drought, flood, fire, good germination, etc.).

Guideline 8: Limit or exclude livestock grazing in identified culturally sensitive areas where grazing is detrimental to such sites.

Guideline 9: BLM will work with livestock grazing lessees to utilize prescribed fire, fencing, rest-rotation, holistic resource management, integrated pest management, and other innovative management practices where appropriate to protect riparian health.

Guideline 10: Native species are recommended for all revegetation and enhancement projects unless they are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions or biological health.

GUIDELINES FOR ANNUAL UPLANDS

TABLE B: Residual Dry Matter (RDM) Guidelines. Definition is pounds/acre by slope and precipitation.			
Precipitation	Slope 0-25%	Slope 26-45%	Slope 46% and Up
10" - 40"	400 lbs.	600 lbs.	800 lbs.
40" - 60"	750 lbs.	1,000 lbs.	1,250 lbs.
60+"	1,000 lbs.	1,500 lbs.	2,000 lbs.

Annual Upland Rangelands

Guideline 11: Grazing will be managed to achieve the RDM levels of Table B. If necessary to meet desired plant community (DPC) objectives, or if there is a probability to promote or enhance native perennial plant communities (including special status plants) to check degradation, then adjust grazing management practices, such as: season of use, RDM, stocking level, distribution, pasture rotation, or other range management practices.

Guideline 12: Continuous season-long grazing is allowed if it has been demonstrated that it can be consistent with achieving a healthy, properly functioning ecosystem.

Guideline 13: Alter livestock grazing or initiate erosion control practices in areas where soil is compacted or prone to accelerated erosion.

Guideline 14: BLM will work with livestock grazing lessees to utilize prescribed fire, fencing, rest-rotation, holistic resource management, integrated pest management, and other innovative management practices where appropriate.

Guideline 15: Make temporary changes to livestock grazing management practices, including increases or decreases in stocking rates and seasons of use in response to important episodic events (drought, flood, fire, good germination, etc.).

Guideline 16: Limit or exclude livestock grazing in identified culturally sensitive areas where grazing is detrimental to such sites.

Guideline 17: Degraded areas may require complete rest or other change in management practices to initiate the recovery process.

Guideline 18: The plan for grazing an any allotment must consider other uses (recreation, wildlife, mineral resource development, etc.) and be coordinated with other users of the public lands so that overall use does not detract from the goal of achieving rangeland health.

Guideline 19: Encourage grazing management practices that sustain biological diversity across the landscape by providing a mosaic of seral stages and vegetation corridors, and minimizing habitat fragmentation.

Guideline 20: Implement aggressive action to reduce the invasion of exotic plant species into native plant communities. Control the spread of noxious weeds through various methods such as grazing management, fire management, and other vegetative management practices.

Guideline 21: Utilize prescribed fire and natural prescribed fire to promote a broad vegetative diversity of healthy plant communities, while creating a mosaic network of interconnected vegetative resources.

Guideline 22: Native species are recommended for all revegetation and enhancement projects unless they are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions of biological health.

Perennial Rangeland Guidelines

Guideline 23: No authorized livestock grazing in new allotments which are native perennial grasslands until guidelines specific to these perennial species are developed and adopted.

Guideline 24: In existing allotments with perennial grass components, if monitoring or documented observation indicates that one of more of the standards is not being met, and if significant progress is not being made toward meeting all of those standards that are not being met, and if there is evidence that current grazing practices are causing or contributing to this unsatisfactory condition, then the following utilization levels will be applied. These utilization levels will be applied unless and until site-specific utilization levels are developed for specific allotments and documented in allotment management plans, other management plans, and/or in terms and conditions of grazing permits/leases. Site-specific utilization levels may be more restrictive than the guidelines presented below, consistent with achieving the desired resource conditions (as prescribed in land use plans and activity plans) and progress toward meeting these.

UTILIZATION GUIDELINES (adapted from Holechek 1988 and Holechek et al. 1995)	
Community Type	Percent of Use of Key Herbaceous Species
Salt desert shrubland	25-35
Semi-desert grass and shrubland	30-40
Sagebrush grassland	30-40
Perennial grass communities within the California annual grassland vegetation type	30-40
Coniferous forest	30-40
Mountain shrubland	30-40
Oak woodland	30-40
Pinyon-juniper woodland	30-40
Alpine tundra	20-30

Management changes will be implemented (e.g., reductions in stocking rate or another management change) if utilization guidelines on the average of the upland key areas across the pasture (or allotment if there is only one pasture) are exceeded for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70% of upland key areas on the pasture (or allotment) are not to exceed maximum utilization guidelines in most years. Because of the potential long-term damage to perennial grass species associated with severe grazing, severe grazing use (>70% utilization) in any upland key area in any year will result in a management change the following year. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of

the allotment that key area represents. The average (mean) utilization on key species will be estimated at each key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 for further discussion on this issue.

For allotments not meeting or making significant progress toward meeting the standards (and for which lower utilization levels of perennial upland species would be expected to help move these allotments toward the standards), utilization data already in hand will be used to determine whether a management change is necessary. Thus, for example, if utilization on a particular key area has exceeded the thresholds in the above table for the two years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are expected to bring utilization levels within threshold values, close monitoring will follow to ensure the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

General Guidelines

Guideline 25: There will be no more than 20 percent utilization of annual growth on key browse species prior to October 1 within identified deer concentration areas.

Guideline 26: Apply the management practices recognized and approved by the State of California as Best Management Practices (BMPs) for grazing related activities to protect and maintain water quality.

Guideline 27: In watersheds draining into water bodies that have been listed or are proposed for listing as having threatened or impaired beneficial uses, and where grazing activities may contribute to the pollutants causing such impairment, the management objective is to fully protect, enhance, and restore the beneficial uses of the water.

2.93 SUSANVILLE RAC RECOMMENDED STANDARDS AND GUIDELINES (Modified)

Changes

Under the Soils standard, the Criteria section was amended by adding a statement about ground cover similar to that in the Ukiah standard. This was done because ground cover is an important element in maintaining healthy soils, and the analysis showed that it had originally been overlooked in this standard.

The Water Quality standard was completely rewritten to comply with law and the BLM regulations. The text was kept short at the RAC's request, with the full intent stated in Appendix 15 of the Final EIS. This appendix contains wording provided by the State Water Resources Control Board.

The Riparian and Wetland standard was amended by adding the phrase "and meeting regional and local management objectives. This was agreed to by the RAC representatives to make it consistent with the Bakersfield and Ukiah riparian standards.

Within the Biodiversity standard, the word "viable" was added to the beginning of the standard for clarification.

Under the Biodiversity standard, a statement dealing with habitat structure was added to the beginning of the Criteria section. This statement was included in both the Bakersfield and Ukiah species standards, and it was suggested that it be included in this standard for consistency, and to clarify the intent.

Guidelines 14 and 15 were suggested by the State Water Resources Control Board, which were added to the guidelines within all three RAC areas.

Guideline 16, addressing utilization levels, was added to the Susanville RAC area guidelines to replace Guideline 14, the Transitional Guideline, which was deleted from Alternative 5. There were a variety of reasons, which are addressed in several places in Chapter 5 and the Annotated Bibliography of the Final EIS. In summary, the discussion of utilization levels generated by the draft EIS resulted in BLM doing an intensive literature review of the best science (requested by both pro-grazing and anti-grazing groups). The inescapable conclusion was that the utilization levels in Guideline 14 were totally inadequate to correct grazing problems where they were occurring, and could, in many cases lead to degradation in areas that are currently meeting rangeland health standards. The RAC did not all concur with this guideline.

Guideline 17 (was 15) was amended to clarify the technical source, and the intent that it be easily accomplished.

Standards for Rangeland Health and Guidelines for Livestock Grazing Susanville Resource Advisory Council

Preamble

Healthy rangelands contribute to the social and economic well being of rural communities in Northeastern California and Northwestern Nevada, and they provide, over the long term, the most reliable harvest of rangeland resources. The objective of rangeland resource planning is to integrate BLM resources with other resources to achieve the mandate of multiple-use and sustained yield management of renewable resources in an environmentally sound and cost-effective manner.

The **Standards** of rangeland health are expressions of physical and biological condition or degree of function required for healthy, sustainable rangelands. The Standards are applied on a landscape scale. Some standards may not apply to all acres. For example, a mosaic of vegetation types and age classes may produce the diversity associated with healthy rangelands; however, some individual vegetation communities within the mosaic may lack diversity.

The Standards always relate to the capability or potential of a specific site. The land will not be expected to produce vegetation or support habitats not attainable due to climate, soils, or other limiting attributes. In instances where site capability or potential has changed due to human-caused or natural disturbance, recognition will be given to the modified capability when setting or assigning a standard to (for) the site. The Standards are designed to establish the threshold for healthy rangelands. In some circumstances, an exception to the Standards or Guidelines may be necessary or unavoidable; however, **these instances should be under extreme conditions only**, and fully justified (documented) in order to be acceptable.

The **Guidelines** for grazing management are the types of grazing management methods and practices determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard. The Guidelines were designed to provide direction, yet offer flexibility for implementation through activity plans and terms and conditions for grazing permits. The Bureau of Land Management (BLM) must operate within the constraints of other regulatory requirements that may affect how standards and guidelines are applied for livestock grazing, for example the Wild Free-Roaming Horse and Burro Act (1971).

SUSANVILLE STANDARDS FOR RANGELAND HEALTH

STANDARD 1: UPLAND SOILS

Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform, and exhibit functional biological, chemical and physical characteristics.

Meaning that:

Precipitation is able to enter the soil surface and move through the soil profile at a rate appropriate to soil type, climate, and landform; the soil is adequately protected against human-caused wind or water erosion; and the soil fertility is maintained at, or improved to, the appropriate level.

Criteria to Meet Standard:

- * Ground cover (vegetation, litter, and other types of ground cover such as rock fragments) is sufficient to protect sites from accelerated erosion.
- * Evidence of wind and water erosion, such as rills and gullies, pedestaling, scour or sheet erosion, and deposition of dunes is either absent or, if present, does not exceed what is natural for the site.
- * Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site.

STANDARD 2: STREAMS

Stream channel form and function are characteristic for the soil type, climate, and landform.

Meaning that:

Channel gradient, pool frequency, width to depth ratio, roughness, sinuosity, and sediment transport are able to function naturally and are characteristic of the soil type, climate, and landform.

Criteria to Meet Standard:

- * Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species.
- * Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events.
- * The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter.
- * Portions of the primary floodplain are frequently flooded (inundated every 1-5 years).

STANDARD 3: WATER QUALITY

Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the State standards within the respective boundaries of the States of California and Nevada.

Exceptions:

Within California, impoundments (stock ponds) and troughs that have a sustained discharge yield of less than 200 gallons per day to surface or groundwater are excepted from meeting drinking water standards per SWRCB Resolution No. 88-63.

Within Nevada, livestock water facilities or impoundments specifically developed for that use are excepted as per Nevada Water Quality Regulations 445A.120 from meeting any stricter water quality standards than for the purposes of livestock water.

(See Appendix 15 for a full explanation of the intention/interpretation of this standard.)

STANDARD 4: RIPARIAN and WETLAND SITES

Riparian and Wetland areas are in properly functioning condition and are meeting regional and local management objectives.

Meaning that:

The riparian and wetland vegetation is controlling erosion, stabilizing stream banks, shading water areas to reduce water temperature, filtering sediment, aiding in floodplain development, dissipating energy, delaying floodwater and increasing recharge of ground water that is characteristic for these sites. Vegetation surrounding seeps and springs is controlling erosion and reflects the potential natural vegetation for the site.

Criteria to Meet Standard:

- * Riparian vegetation is vigorous and mostly perennial, and diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines.
- * Riparian vegetation and large woody debris are well anchored and capable of withstanding high stream flow events.
- * Negligible accelerated erosion as a result of human related activities is evident.
- * Age class and structure of woody riparian and wetland vegetation are appropriate for the site.

Exceptions and Exemptions to Standard 4 (where Standard 4 is not applicable)

- * Structural facilities constructed for livestock/wildlife water or other purposes are not natural wetland and/or riparian areas. Examples are: water troughs, stock ponds, flood control structures, tailings ponds, water gaps on fenced or otherwise restricted stream corridors, etc.

STANDARD 5: BIODIVERSITY

Viable, healthy, productive and diverse populations of native and desired plant and animal species, including special status species, are maintained.

Meaning that:

Native and other desirable plant and animal populations are diverse, vigorous, able to reproduce, and support nutrient cycles and energy flows.

Criteria to Meet Standard:

- * Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations.
- * A variety of age classes is present for most species.
- * Vigor is adequate to maintain desirable levels of plant and animal species to ensure reproduction and recruitment of plants and animals when favorable events occur.
- * Distribution of plant species and their habitats allow for reproduction and recovery from localized catastrophic events.
- * Natural disturbances such as fire are evident, but not catastrophic.
- * Non-native plant and animal species are present at acceptable levels.
- * Habitat areas are sufficient to support diverse, viable, and desired populations and are connected adequately with other similar habitat areas.
- * Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and maintain soil health.

SUSANVILLE RAC GUIDELINES FOR LIVESTOCK GRAZING

The following guidelines are meant to apply to one or more of the standards for rangeland health.

Guideline 1: A stubble height threshold will be present on all stream-side areas at the end of the growing season, or at the end of the grazing season if grazing occurs after fall dormancy. The residual or regrowth should provide sufficient herbaceous forage biomass to meet the requirement of plant vigor maintenance, bank protection, and sediment entrapment.

Utilization of stream-side herbaceous and woody plants should be limited to a specified amount of the current growth, and/or livestock should be removed to allow sufficient time for plant regrowth.

- a. Late season use (summer or fall grazed pastures) requires more restrictive utilization based on site specific situations.
- b. Special situations such as fragile fisheries habitats or easily eroded stream banks may require more restrictive utilization thresholds.
- c. Hoof action impacts or chiseling on stream banks will not exceed specified thresholds so that stream bank stability is maintained or improved.

Guideline 2: Desired seral states will be determined through the Allotment Management Plan development process; generally the goal will be to achieve advanced ecological status in the riparian zone.

Guideline 3: Periods of rest from livestock grazing or other avoidable disturbances must be provided during/after periods of stress on the land (e.g: fire, flood, drought) and during critical times of plant growth.

Guideline 4: Plans for grazing on any allotment must consider other uses (recreation, archaeological sites, wildlife, horses and burros, mineral resource extraction, etc.) and be coordinated with the other users of public lands so that overall use does not detract from the goal of achieving rangeland health.

Guideline 5: Intensity, frequency, season-of-use, and distribution of grazing shall provide for growth and reproduction of desired plant species and the achievement of the potential natural vegetation or desired plant community.

Guideline 6: Grazing permits will include site-specific, measurable terms and conditions.

Guideline 7: Design and work towards implementation of a grazing management strategy for livestock for each grazing unit (pasture) within I (Improvement) and M (Maintenance) category allotments, to maintain or improve rangeland health. This may consist of, but not be limited to, season-of-use, rotation, or by setting utilization levels for desirable plants. Each management plan implemented will incorporate the factors necessary to maintain the health of desirable plants.

Guideline 8: Determination of grazing use by livestock must provide for the habitat requirements of fish and wildlife.

Guideline 9: Grazing management practices must sustain biological diversity across the landscape. A mosaic of seral stages, vegetation corridors, and minimal habitat fragmentation must be maintained.

Guideline 10: Take aggressive action to reduce the invasion of undesirable exotic plant species into native plant communities. The spread of noxious weeds will be controlled through appropriate methods such as grazing management, fire management, and other management practices.

Guideline 11: Prescribed fire and (natural) prescribed fire will be utilized to promote a mosaic of healthy plant communities and vegetative diversity.

Guideline 12: Grazing and other management practices shall take advantage of transitional opportunities (e.g., drought, flood, fire) to enhance or establish populations of desirable tree, shrub, herbaceous and grass species. Utilization levels will be established for desired seedlings, saplings, and/or mature plants to promote their presence in the plant community.

Guideline 13: Development of springs, seeps, and other water related projects shall be designed to promote rangeland health. Wherever possible, water sources shall be available year long for use by wildlife.

Guideline 14: Apply the management practices recognized and approved by the States of California and Nevada as Best Management Practices (BMPs) for grazing related activities to protect and maintain water quality.

Guideline 15: In watersheds draining into water bodies that have been listed or are proposed for listing as having threatened or impaired beneficial uses, and where grazing activities may contribute to the pollutants causing such impairment, the management objective is to fully protect, enhance, and restore the beneficial uses of the water.

Guideline 16: Utilization Levels

If monitoring or documented observation indicates that one or more of the standards is not being met, and if significant progress is not being made toward meeting all of those standards that are not being met, and if there is evidence that current grazing practices are causing or contributing to this unsatisfactory condition, then the following utilization levels will be applied. These utilization levels will be applied unless and until a current site-specific analysis is completed and new utilization levels are developed for specific allotments and documented in allotment management plans, other management plans, and/or in terms and conditions of grazing permits/leases.⁴ New site-specific utilization levels that are developed may be more restrictive than the guidelines presented below, consistent with achieving the desired resource conditions (as prescribed in land use plans and activity plans) and progress toward meeting the standards.

Utilization of key upland herbaceous species

UTILIZATION GUIDELINES (adapted from Holechek 1988 and Holechek et al. 1995)	
Community Type	Percent of Use of Key Herbaceous Species
Salt desert shrubland	25-35
Semi-desert grass and shrubland	30-40
Sagebrush grassland	30-40
California annual grassland	50-60*
Perennial grass communities within the California annual grassland vegetation type	30-40
Coniferous forest	30-40
Mountain shrubland	30-40
Oak woodland	30-40
Pinyon-juniper woodland	30-40
Alpine tundra	20-30

⁴ Only those guidelines that are applicable to making progress toward meeting the standards that are not being met need be applied. For example, if only riparian standards are not being met, then only the guidelines applicable to utilization and stubble height of riparian vegetation would be applied.

- * Residual dry matter (RDM) guidelines will be used instead of these utilization levels for management of annual species in the California annual grassland. These RDM levels correspond approximately with these utilization levels. The RDM levels given in the table under Alternative 5, Ukiah RAC Recommended Standards and Guidelines (Section 2.92), will be used for those few annual allotments within the area covered by the Susanville RAC.

Utilization of key upland browse species

There will be no more than 20 percent utilization of annual growth on key browse species prior to October 1 within identified deer concentration areas.

Utilization of key riparian species

A 4-6 inch minimum stubble height will remain at the end of the growing season in most riparian areas.

There should be no more than 20% utilization on key riparian trees and shrub species in those areas where the presence of woody riparian species is necessary to meet standards.

Implementation of this guideline

1. Uplands (including perennial grass and browse communities).

Management changes will be implemented (e.g., reductions in stocking rate or another management change) if utilization guidelines on the average of the upland key areas across the pasture (or allotment if there is only one pasture) are exceeded for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70% of upland key areas on the pasture (or allotment) are not to exceed maximum utilization guidelines in most years. Because of the potential long-term damage to perennial grass species associated with severe grazing, severe grazing use (>70% utilization) in any upland key area in any year will result in a management change the following year. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents. The average (mean) utilization on key species will be estimated at each key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 for further discussion on this issue.

For allotments not meeting or making significant progress toward meeting the standards (and for which lower utilization levels of perennial upland species would be expected to help move these allotments toward the standards), utilization data already in hand will be used to determine whether a management change is necessary. Thus, for example, if utilization on a particular key area has exceeded the thresholds for the two years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are expected to bring utilization levels within threshold values, close monitoring will follow to ensure the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be

required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

2. Riparian areas (including herbaceous and woody plant communities).

Management changes will be implemented (e.g., reductions in stocking rate or another management change) if stubble heights on the average of the key riparian areas across the pasture (or allotment if there is only one pasture) fall below the guidelines for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70% of riparian key areas on the allotment are to exceed minimum stubble heights in most years. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents.

Because stream banks may be inadequately protected by heavy use in any one year and because stubble heights below 3 inches result in cattle shifting their preference to shrubs, stubble heights below 2 inches in any one year will require a management change in the following year.

The mean stubble height on key riparian species will be estimated at each riparian key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 for further discussion on this issue.

For allotments not meeting or making significant progress toward meeting the standards (and for which higher stubble would be expected to help move these allotments toward the standards), stubble height data already in hand will be used to determine whether a management change is necessary. Thus, for example, if stubble heights on a particular key area have fallen below the thresholds for the two years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are expected to bring stubble heights within threshold values, close monitoring will follow to ensure the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

Guideline 17: Rangeland monitoring to determine utilization of forage resources and trend of rangeland health will be conducted in each allotment based on current accepted practices and techniques as directed in the Interagency Technical Reference: *Utilization Studies and Residual Measurements* (1996). Monitoring methodologies will be applicable to local conditions and developed in consultation with permittees and interested publics.

Monitoring methods will be simple and easily accomplished. Permittees and others will be able to do the monitoring. BLM will be responsible for monitoring key areas.

CHAPTER 3: AFFECTED ENVIRONMENT

3.1 GENERAL SETTING

The area covered by this EIS consists of approximately 5.7 million acres of public land, including 4.2 million acres of public land in the northern two-thirds of California and 1.5 million acres of public lands in northwestern Nevada. About 4.4 million acres of these public lands are grazed. The 10.3 million acres of public lands in southern California managed by the California Desert District will not be addressed in this document.

Chapter 3 describes the currently existing physical, biological, social, and economic environment that would be affected by implementing any of the alternatives. Prime and unique farmlands, air quality, hazardous wastes, cultural resources, and areas of critical environmental concern (ACECs) would not be affected by implementing any of the alternatives. However, some resources protected by ACECs would be affected and these are described in this chapter.

3.1.1 Landforms

The coastal province of California is dominated by the Central Valley. This vast sedimentary alluvial plain stretches more than 400 miles north to south, and averages 40 to 50 miles in width. It is bounded on the west by the Coast Range, on the south by the Sierra Madre and Tehachapi Mountains, on the east by the Sierra Nevada, and on the north by the Klamath Mountains, the Cascades, and the Modoc Plateau.

The Central Valley is fed by two major rivers. The Sacramento River, which flows south fed by Mount Shasta's melting snow, is joined by the Pit, McCloud, Feather, Indian, Yuba, and American Rivers which all flow down the western slope of the Sierra Nevada. The San Joaquin River, flowing north, is joined by the Fresno, Merced, Tuolumne, Stanislaus, Calaveras, Mokelumne, and Consumnes Rivers, again all flowing from the Sierra Nevada.

If the Central Valley is the dominant feature of California, the Sierra Nevada is its backbone. This huge granitic range runs about 385 miles north to south and averages 80 miles in width. The range is generally higher in the south and trends lower in the north. There are about 40 peaks over 10,000' elevation, with several topping 14,000'. The eastern slope is very steep, evidence of fault block uplifting; while the western slopes are more gradual, but rugged where the canyons are cut by the large rivers mentioned above.

North of the Central Valley are the Klamath Mountains, the Cascade Range, and the Modoc Plateau. The Cascades are a chain of volcanic cones dominated by Mount Shasta at an elevation of over 14,000'. The Modoc Plateau is an interior draining platform consisting of a thick accumulation of lava flows and tuff beds with many small volcanic cones.

The Coast Range is a series of small mountain chains ranging from 2000 to 7000' elevation, with the higher elevations generally to the north and the lower elevations to the south. These small chains contain numerous small fertile valleys. Many active fault zones, including the San Andreas Fault, occur throughout the length of these ranges. To the north, there are myriad rivers and streams, such as the Klamath, Mad, Eel, and Russian Rivers, flowing west into the ocean. To the south, rivers such as the Salinas, Santa Maria, and Santa Ynez become smaller, and are often intermittent rather than perennial.

East of the Sierra and Cascades is the Great Basin, which extends from California east into Nevada and Utah, and north into SE Oregon, and southern Idaho. This area is typified by north-south trending mountain ranges such as the White Mountains to the east of the Owens Valley. The region is watered in places by perennial or intermittent streams running from the mountains, which form wetlands and marshes or disappear into the dry valley bottoms.

More detailed geologic and topographic information may be obtained from the BLM State Office and Field Offices in the EIS area.

3.1.2 Climate

The climate of the EIS area varies from Mediterranean for most of the area, to steppe in scattered foothill and inland basin areas, to alpine in the high Sierra.

The Pacific Ocean and its maritime air masses have a heavy influence on the climate. The effect of abrupt changes in topography on temperature, wind velocity, and precipitation amount and frequency results in wide variations often within a few miles. The Sierra Nevada and the Cascade Range effectively act as barriers for the movement of continental air masses from the east.

Two of the usual four seasons dominate the EIS area: a dry, warm summer and a cool, wet winter season. Winter lasts from October to April in the north and from November to March in the south.

Winter storms from the west bring precipitation which falls as rain in the valleys and foothills and as snow in the mountains. Precipitation increases from south to north, and falls heaviest on the west side of the mountains. Average annual rainfall is about 11" in Los Angeles, 22" in San Francisco, and 74" in Crescent City. However, the rainfall can vary greatly from year to year, and even within a few miles due to changes in the topography. When the snowpack melts in the spring, the heaviest runoff descends the west side of the mountains. Eastern mountain slopes fall into typical "rain shadows." Locations on the western slope of the Sierra may receive as much as 60" of rain, while the Owens Valley on the eastern side typically receives about 6".

Snow is the major form of precipitation in high, forested, mountainous areas. It can be expected in the Sierra Nevada at any elevation above 2,000 feet during October to May. Above 4,000 feet, snow will remain on the ground for long periods of time, and at even higher elevations will be present all winter.

3.1.3 Hydrology

Hydrology on rangelands in California is quite varied, but can be generalized into three categories based on rainfall: Coastal (tending toward subtropical), Central Valley and foothills (Mediterranean), and East Side or Great Basin (semi-arid). Precipitation through these climatic types is also highly variable. In the rain shadow portion of the Great Basin annual precipitation is as low as 4 to 6 inches; along the north coast it exceeds 100 inches. On the east side of the Sierra, precipitation comes mainly as snow with slow melting and little runoff. In the Central Valley and coast it comes mainly as rain in the winter, often with high intensities and high runoff and flooding. The monsoonal precipitation common in the Sonoran desert of southeast California does not generally occur in the area covered by this EIS.

Hydrology is just as diverse as the climate. The most obvious generality that can be made is that the Great Basin riparian areas are supported by small spring-fed or snow-fed streams, which are mostly intermittent or ephemeral. These streams tend to lose water to the water table as they flow downstream. In contrast, Central Valley and coastal streams are fed by the ground water (the ground water level is generally higher than the stream bed) and gain water down stream. These streams tend to be more persistent than those in the east.

Extensive research has been conducted by universities and research units on the hydrology of California and Great Basin rangelands. More detailed or specific discussions of this subject may be found in these studies. A good introduction to the subject is "Rangeland Hydrology," originally published by the Society for Range Management in 1972, with a second edition published by Kendell/Hunt in 1981 (Branson et al. 1972/1981).

3.2 GRAZING MANAGEMENT and ADMINISTRATION

3.2.1 Allotments and Types of Operation

As previously mentioned, the area covered by this EIS consists of approximately 4.2 million acres of public land in the northern two-thirds of California and 1.5 million acres of public lands in northwestern Nevada. This area is administered by ten BLM Field Offices (previously called Resource Area offices, and sometimes still referred to as such in this document). Currently there are 649 grazing allotments within the area, consisting of 4.4 million acres of public rangeland, producing 338,715 animal unit months (AUMs) of livestock forage (see Table 3.2.1). Traditionally about 90% of this is grazed by cattle and the remainder by sheep.

Note that the number of allotments is different from that used for the Draft EIS. This is mainly due to an oversight in interpreting the records. One office in particular had included within the total number of allotments those which are no longer available for grazing. Most of these allotments consisted of isolated parcels of public land intermingled with privately owned lands, and BLM has disposed of those public lands (through sale or land exchange) or in some cases the allotments were determined to be no longer available for grazing due to some other reason. Some of the other adjustments of allotment numbers reflect land exchanges that have occurred since the preparation of the Draft EIS.

California rangelands are quite unique due to very diverse environmental conditions which require a variety of administrative and management measures for different locations within the state. While BLM administers grazing on perennial vegetation ranges in the Great Basin areas of California and northwestern Nevada (which are typical of most of the public lands in the western states), there is also a substantial amount of grazing on California's public lands for ephemeral and annual vegetation. Approximately one million acres of public lands within the Mediterranean climate regime contain highly productive grasslands which are composed predominantly of non-native annual grasses and forbs. This type of rangeland is located from the mid-elevations on the western slope of the Sierra Nevada to the Pacific coast throughout the length of California, and is unique in that it is found nowhere else in North America.

Due to this variability in environmental conditions, the types of grazing operations and practices are quite varied throughout the analysis area. In the Great Basin region in NE California and NW Nevada, as well as along the Eastern Sierra escarpment, the majority of allotments consist of relatively large acreages of publicly owned rangelands, sometimes

exceeding 100,000 acres. These allotments are mostly grazed during the snow-free season, and the livestock are removed from the allotments and held on privately owned holdings at lower elevations during the winter months. Generally, cow-calf type operations prevail in this region with a few operations using yearling stocker cattle. Historically much more of the region was grazed by sheep than now. However, there are a few sheep operations remaining in the region. Often the sheep are trailed great distances, particularly in the Eastern Sierra region. In some years, sheep operators use ephemeral forage, when available, in the Owens Valley while trailing from ranges in the Mojave Desert to summer ranges at higher elevations.

TABLE 3.2.1: Grazing use within the EIS area			
Field Office	# Allotments	# Acres (1000's)	# AUMs
Redding	38	32	3,658
Clear Lake	15	20	1,580
Arcata	11	35	4,122
Eagle Lake	57	990	52,039
Surprise	52	1,454	97,515
Alturas	157	501	56,330
Bishop	60	614	36,931
Folsom	65	69	7,341
Caliente	113	469	56,225
Hollister	81	166	22,974
TOTAL	649	4,350	338,715

Typically the livestock grazing practices and dependency upon the availability of public rangelands in most of the remainder of the analysis area is quite different than in the Great Basin region. This is due to the much different climate and land ownership pattern. Whereas some of the ranges in the Mediterranean and coastal region are grazed all year, the majority of the grazing is limited to the winter and spring months when the annual grasses and forbs are most productive and nutritious. As a rule these publicly owned rangelands are fragmented and mixed with privately owned rangelands, and are only a small portion of the overall grazing for the allotment or ranch. Many of the operations are ranch-based types of operations in which the livestock basically reside within the ranch boundaries at all times and are not as migrant as those in the Great Basin. There is some grazing of sheep on these ranges, but the majority are used by cow-calf and yearling stocker operations.

Almost without exception, there is some amount of grazing on unfenced privately owned rangelands in conjunction with the grazing use on the public rangelands throughout the entire analysis area. On over half of the allotments, the amount of privately owned rangelands exceeds the amount of publicly owned rangelands within the area grazed.

3.2.2 Grazing Permits and Leases

Traditionally, grazing use is authorized by the BLM as permits or leases for a period of 10 years. Shorter term permits and leases are sometimes issued for special circumstances, such as to accommodate a shorter term lease of the base property or when the authorized officer determines that a shorter term authorization is in the best interest of range management. Additionally, non-renewable grazing authorizations may be issued for special short-term needs such as trailing, or to allow for grazing use where it has been determined there is short-term surplus forage available for grazing. All permits and leases are subject to modifications and to annual adjustments. These are implemented through consultation between the permittee/lessee and the BLM.

The permits and leases identify the number, kind and/or type of livestock that may graze the allotment, and the grazing period (usually with specific beginning and ending dates). In addition, many permits and leases also require adherence to prescribed grazing prescriptions in the form of grazing systems such as deferred, deferred-rotation, or rest-rotation (see Glossary). Other authorizations may have conditions pertaining to turn-out dates based on soil or vegetation conditions or require (as an example) a post-grazing residual mulch level. Some permits/leases also have specific grazing utilization standards and other specified conditions to protect site specific areas, such as riparian areas, deer fawning habitat, special status plant populations, etc. Usually these conditions have been developed in consultation and cooperation between BLM and the livestock operator in the form of an allotment management plan or other planning effort.

Often there are occasions when the permittee or lessee elects to graze less than the full amount of grazing authorized for the grazing season. Sometimes this is due to environmentally-related factors such as droughts or fires and in other cases it may be to accommodate the livestock operator's needs to adjust livestock numbers for marketing or livestock husbandry purposes. Normally the BLM will authorize the requested amount of non-use on a short-term basis for the above reasons. In some situations the BLM may temporarily authorize another qualified applicant to graze the amount of authorized non-use in an allotment, but this is seldom done.

3.2.3 Range Improvements

In order to facilitate more effective and economical grazing use, structural facilities, commonly called range improvements, are installed on the allotments. Some of these improvements, such as corrals and other exclosures, are needed to facilitate the handling of livestock; others, such as wells and spring developments, are to provide water for the livestock and wildlife. Other improvements, such as fences or strategically located watering or salting facilities, are more related to controlling the livestock for effective grazing management, by re-distributing the grazing activities throughout the allotment (although they may improve wildlife habitat too). Traditionally these types of facilities have been installed as cooperative ventures between the permittee/lessee and the BLM. Many of these types of improvements have been installed and maintained exclusively by the rancher as permitted by BLM. Many facilities are also located on privately-owned or non-Federal lands within allotment boundaries. In the past, there have been re-vegetation or vegetation conversion projects on some allotments or parts of allotments. Examples include re-seeding projects using either exotic or native species, and brush control projects using either mechanical or chemical

methods or prescribed fire. There has been mixed success with all of these projects in meeting expectations.

3.2.4 Grazing Systems

Most prescribed grazing systems are designed cooperatively between the permittee/lessee and the BLM to meet both the needs of the rancher and to protect or enhance some non-livestock related rangeland resources. Often there is some compromise by both parties in order to achieve objectives. Some of the grazing systems are quite intensive, requiring frequent monitoring and oversight by both the livestock operator and the BLM. These systems may include scheduling of livestock movement dates between pastures and established grazing utilization thresholds either in the form of percent of forage removed or grazing stubble height requirements. Other systems may require that a certain amount of forage growth be evident prior to any grazing and/or that a specified amount of residual vegetation be left after the grazing period. This latter condition is common for the allotments in the California annual grasslands.

As a rule, most of the allotments with a substantial amount of public rangeland have a BLM prescribed intensive grazing system. These allotments constitute most of the public land acres grazed. On the other hand, on allotments containing small amounts of public land, particularly those which also contain a majority of privately owned or controlled lands, the grazing systems used are more at the discretion of the livestock operator. However, in all situations, the permittee/lessee is responsible to adhere to all of the terms and conditions identified within the grazing authorization, and BLM is responsible for conformance oversight and the monitoring of resource conditions.

BLM sets priorities for which allotments require intensive grazing management to meet public rangeland resource needs, realizing that capabilities are limited to fully prescribe and monitor intensive grazing management on all allotments. Appendix 5 identifies the current allotment management prioritization in the EIS area. Most of the allotments identified for "I" (intensive or improvement needed) management, as well as many of the "M" (moderate or maintain) allotments, have prescribed grazing systems.

Managing livestock grazing to meet both the economic needs of the permittee/lessee and to meet the needs of all rangeland resources is very challenging in many situations. Many of the allotments, for example, contain relatively small areas of riparian and wetland habitats, fragmented throughout the allotment. Because livestock are attracted to these areas for their succulent forage, shade and water, it is extremely difficult to sustain the resource values of these areas without intensive herding of the animals or installing fences or other barriers (Kie and Boroski 1996). The amount of forage, although quite lush, that these areas provide in comparison to the total for the allotment is often quite small (bordering on minuscule). Grazing systems involving changing the timing or level of grazing use on these areas have had mixed success, and managing these areas continues to be perplexing.

Another recent challenge for both the livestock operators and the BLM involves protecting populations of threatened and endangered plant and animal species habitat. As an example, some of the grazing allotments in the San Joaquin Valley managed by the Caliente and Hollister Field Offices contain scattered populations of threatened or endangered plant species. Much is not yet known about the influence grazing may have on these species. Efforts have been made to exclude some of these populations from grazing by installing

fences or having the livestock operator agree to not graze a specific area during an assumed critical time of the year. However, most of these plants are annuals and the locations and magnitude of the populations often vary greatly between growing seasons. Providing ample protection for these species remains challenging, particularly in areas where the public rangelands are intermingled with comparatively larger amounts of non-Federally owned land.

Another common issue related to livestock grazing on several allotments relates to competition between domestic livestock grazing activities and other ungulates for forage and habitat. This is particularly true regarding dietary overlap between domestic livestock, wild horses and burros, and mule deer in the Great Basin ecoregion. There remains considerable dispute about what levels of grazing use for livestock can be sustained and what levels of use and population numbers are appropriate for competing ungulate species.

3.2.5 Monitoring.

Monitoring can be defined as the orderly, repeated collection and analysis of resource data to evaluate progress in meeting resource management objectives (this is based on BLM Manual 6600). The repetition of measurements over time for the purpose of detecting change distinguishes monitoring from inventory.

Types of monitoring.

Several types of monitoring have been identified. The following two are particularly relevant to monitoring livestock grazing (see MacDonald, et al. 1991, for a discussion of these and other types of monitoring).

1. **Trend monitoring.** Monitoring to determine the long term trend in a particular parameter. For example, is the population of a key species increasing, decreasing, or remaining stable at a particular site?
2. **Implementation or compliance monitoring.** This type of monitoring assesses whether activities were carried out as planned or whether livestock operators are complying with the terms of management plans and permits/leases. For example, did BLM construct the pasture fence in FY 1993 as called for in the activity plan? Did the operator move the mineral blocks at least 1 mile from the riparian-wetland areas as required in the allotment management plan? One of the major types of rangeland monitoring, involving the measurement of utilization (or the reverse of utilization--residue) is a form of compliance monitoring. We'll discuss this in detail below.

Levels of monitoring.

Qualitative and semi-quantitative monitoring. Although many people equate monitoring with the gathering of some type of quantitative information, qualitative assessment of the condition of rangeland resources is a valid and important form of monitoring. Because of constraints related to limited budgets and workforces and the number of allotments for which BLM is responsible, qualitative monitoring is the level of monitoring most commonly employed in grazing management. Following are types of qualitative and semi-quantitative monitoring:

1. **Stewardship integrity monitoring.** This involves visiting areas to ensure the habitat has not changed dramatically, as might occur with fire, overgrazing, trespass mining,

vehicular use, etc. Aerial photography at specified intervals could also be used to assess some of these impacts without actually visiting the site.

2. **Photoplots.** Photographs can provide important documentation of changes, particularly to habitat, over time. Although listed here under qualitative techniques, photoplots can also be used as a form of quantitative measurement. For example, several close-up photographs may be taken at a site and the number of individuals of the plant species of interest in each photograph counted or estimated.
3. **Presence or absence.** Sites are visited to determine if a rare species is still extant or to determine whether a noxious weed has invaded a site.
4. **Occurrence mapping.** An occurrence of a rare species or a riparian area may be mapped by delineating the distributional boundaries on the ground or on aerial photos.
5. **Ocular estimates of density.** Sites are visited and estimates of abundance made of rare or key plant species. The plant species is ranked as to abundance class (e.g., not present, 1-10 plants; 11-100; 101-1000; 1001-10,000; etc.).
6. **Utilization pattern mapping.** Mapping the utilization made on key forage species is an important and effective form of grazing monitoring. The entire allotment or individual pasture is canvassed, usually following the removal of livestock, and the amount of utilization in different areas on one or more key plant species is assessed. Areas are then mapped into several classes based on level of utilization (e.g., no use, light use, moderate use, and heavy use). Ocular estimation is often used to assign areas to one of these classes, but sometimes quantitative studies are also used (e.g., utilization transects are established in different areas of the allotment and used to assign these areas to a particular utilization class).

Utilization mapping is usually done each year for several years to determine if patterns are consistent from year to year. Where rest rotation grazing systems are in place, yearly mapping is normally conducted until the completion of at least one rotational cycle. The results of utilization pattern mapping can then be used to identify over-utilized areas of the allotment in need of adjustment through different management and to locate key areas (discussed below) for future monitoring studies.

7. **Other observations.** Additional information deemed to be important may be collected based on ocular estimates. Examples are: presence/absence of individuals of a key species in different size classes; rough categorical estimate of the percent of plants in each size class; presence/absence of a defined condition in individuals at a given location (e.g., flowering, diseased, infested by insects, dead); rough categorical estimate of the percent of plants exhibiting the condition (e.g., 25-50% flowering).

The strengths of qualitative and semi-quantitative monitoring are that it is quick and therefore inexpensive, it allows assessment of large areas, such as complete allotments and pastures, it provides insight on condition and management needs, and it can serve as a "red flag" to trigger quantitative monitoring. The weaknesses of this type of monitoring are that different observers may reach different conclusions when no real difference exists; the interpretation is

somewhat subjective; it provides purely descriptive information with no potential for analysis; and the only detectable change is often dramatic and severe.

Quantitative monitoring. In performing quantitative monitoring studies you *measure* something. This can mean, for example, that you count the number of individuals of a key plant species (either in total or by size class), you estimate its cover in plots, or you measure the size (height, cover or both) of individual plants. Quantitative monitoring involves taking a sample to estimate something about the parameter of interest, such as the cover or vigor of a key species in a pasture. Because sampling is involved, there is error around estimates of these parameters that must be considered in analysis. Statistical analysis takes these sampling errors into account when determining whether changes have occurred or thresholds (such as utilization levels) have been crossed.

Key area concept. Many, if not most, rangeland vegetation monitoring studies employ the key area concept. Using this approach, key areas are selected (subjectively) that (we hope) reflect what is happening on a larger area. Key areas are areas chosen to be representative of a larger area (such as a pasture) or critical areas such as riparian-wetland areas and sites where endangered species occur. Monitoring studies are then located in these key areas.

Although we would like to make inferences from our sampling of key areas to the larger areas they are chosen to represent, there is no way this can be done in the statistical sense because the key areas have been chosen subjectively. An alternative is to sample the larger areas, but the constraints of time and money coupled with the tremendous variability usually encountered when sampling very large areas often makes this impossible. The key area concept represents a compromise.

Because statistical inferences can be made only to the key areas that are actually sampled, it is important to develop objectives that are specific to these key areas. It is equally important to make it clear that actions will be taken based on what happens in the key area, even when it can't be demonstrated statistically that what is happening in the key area is happening in the area it was chosen to represent. It is also important to base objectives and management actions on each key area separately. *Values from different key areas should never be averaged.*

Key species concept. Just as the key area concept is a compromise between sampling an entire allotment versus sampling only a portion of it, the key species concept is a compromise between tracking change in all plant species versus tracking change in those species that are most likely to be affected by management. The latter species are called key species and are chosen based on several criteria. First, they are usually species that are preferred forage for livestock. Thus, they can be expected to increase under proper grazing management and decrease under improper grazing management. They therefore provide valuable information on the success of management. Second, they should be common enough that monitoring them will not be overly difficult or intensive. Third, changes in the distribution, vigor, or abundance of these key species should be representative of similar changes to other species deemed to be important to the plant community desired for a particular site. In this instance key species serve as keystone or indicator species. A fourth criteria that can be employed is legal status: special status plants may be singled out to be monitored regardless of their rarity or whether they function as keystone or indicator species.

Long-term (trend) monitoring. What most interests the range manager is how ecosystems (including plant and animal communities and abiotic factors such as soil) change over time in response to management. Usually only vegetation is monitored and an assumption made that if certain types and amounts of desired vegetation are present then the desired animals and desired soil conditions are also present. The assessment is made through either quantitative or qualitative monitoring studies usually located in key areas of the allotment. Photoplots and checklists are the principal qualitative monitoring method used in trend monitoring. An example of the checklist approach is the proper functioning condition checklist used in riparian areas. Although this approach can be considered to be inventory, its use at the same site on two or more occasions is a form of monitoring.

Quantitative monitoring methods are several and usually entail the measurement of some attribute of key species at key areas. The Interagency Technical Reference, Sampling Vegetation Attributes (BLM et al. 1996a), includes most of the types of range studies employed by BLM nationwide. In the EIS area the two most common quantitative trend methods involve the use of cover and frequency measurements.

Cover measurements entail the estimation of the percentage of ground surface covered by vegetation. Three types of cover are measured, depending on the measurement method and the biology of the target plant(s). *Canopy cover* is the area of ground covered by the vertical projection of the outermost spread of the foliage of plants, including any small openings in the canopy. Canopy cover measurements are used in estimating the cover of shrubs, trees, and herbaceous plants. The line intercept method (BLM et al. 1996a) is most often used to estimate shrub and tree cover or, alternatively, aerial photographs are used. Canopy cover of herbaceous plants is usually made using plots, such as those described for the Daubenmire method (BLM et al. 1996a). *Foliar cover* is the area of ground covered by the vertical projection of the aerial portions of plants, with small openings in the canopy excluded. This is the type of cover measured by the point intercept method (BLM et al. 1996a), a method used primarily for herbaceous plants. *Basal cover* is the area of ground surface occupied by the basal portion of plants. This is the type of cover often used to monitor changes in bunchgrasses or tree stems. The basal area of bunchgrasses is estimated using line intercepts or estimation in plots. Several methods are applicable to the estimation of tree basal cover; these, however, are rarely used in grazing-related monitoring and will therefore not be discussed here.

Depending on objectives, cover is measured on key species, on all species, or on broad cover categories (e.g., live vegetation, litter, bare ground, and gravel). Total ground cover is important in determining whether sites are adequately protected from accelerated wind and water erosion. Cover of key species is important in determining whether objectives relative to increasing or maintaining the key species are being met.

Changes in the canopy and foliar cover of herbaceous species can be difficult to interpret because they can vary widely with climatic fluctuations. It is therefore difficult to tell whether changes are due to grazing management, weather, or a combination of both. Basal cover is much less sensitive to climatic fluctuations and a better indicator of trend in those species that are amenable to basal cover measurement (e.g., perennial bunchgrasses). The canopy and foliar cover of most woody shrubs does not vary nearly as much as herbaceous plants with climatic fluctuations, and these types of cover are often used to assess trend due to management (sub-shrubs, however, can present the same interpretation problems as herbaceous plants).

Frequency is another attribute often used to assess long-term trend on rangelands. It is one of the easiest and fastest methods available for monitoring vegetation. Frequency is the number of plots (called quadrats) occupied by a particular species, expressed as a percentage. For example, let's say we decide to sample 100 randomly placed 1m x 1m quadrats in a key area. If 40 of these have Key Species A in them, then we say that the frequency of Key Species A in that key area is 40 percent (note that we are interested only whether the species is present or absent in each quadrat--a species is present in a quadrat if 1 or if 100 plants occur in it). We then compare this 40 percent frequency with the value we come up with the next time the key area is sampled to determine if the trend in this key species is up, down, or static. The best results are obtained when frequencies range from 20-80 percent.

Unlike cover, which is not dependent on the type or size of sampling unit used, frequency is only meaningful when the same quadrat size and shape is used in each year of measurement. When measuring the frequency of more than one plant species, it is often difficult to use the same size quadrat and maintain a frequency of 20-80 percent for all species. In these situations a nested frequency quadrat is often used. For example, within a 1m x 1m quadrat, three other quadrat sizes, 50cm x 50cm, 30cm x 30cm, and 10cm x 10cm, are nested. At each random placement of the quadrat, the smallest to the largest quadrat size is searched for the target species. If the species is found in the smallest quadrat, then it is also found in all other quadrats; if it is not found in the smallest quadrat, then the next smallest quadrat is searched, and so on. Once the first year's data are collected, optimal quadrat sizes can be determined for each species.

Changes in frequency can be due to changes in density or spatial pattern. Interpretation can be difficult because of this. However, if the data are recorded on a quadrat-by-quadrat basis, if seedlings and established plants are recorded separately, and if other trend data such as cover are collected at the same time, interpretation becomes easier.

The vertical structure of vegetation can be extremely important to wildlife. This is especially true in riparian areas. Most offices monitor this through the use of photoplots and other qualitative methods. Some offices use quantitative techniques such as the cover board method (BLM et al. 1996a) to monitor vertical structure.

Short-term (utilization) monitoring. Except for very favorable sites, such as riparian-wetland areas, changes in vegetation attributes such as frequency and cover can be very slow, making it hard to detect these changes until many years or even decades have passed. This lag time not only makes it difficult to assess the effects of management, it can place the natural resources at risk: if the changes, once they are detected, are in the wrong direction, correcting this downward trend may be all that more difficult or even impossible. Supplementing long-term monitoring with short-term monitoring studies is a means of reducing this risk. These short-term studies either monitor the amount of utilization made on key plant species or they monitor the amount of plant material remaining after grazing (the latter is referred to as residue).

Management objectives are developed that specify how much utilization is allowed on key species or, alternatively, the minimum amount of residue allowed before livestock are moved off a pasture. Utilization or residue is then estimated through monitoring studies, and management actions implemented accordingly. These management actions can consist of taking immediate action in the same year (i.e., immediately moving livestock out of the

pasture once the utilization or residue threshold is approached or crossed) and of making long-term changes to the livestock grazing on an allotment (i.e., reducing stocking rate or season of use if utilization levels are consistently high or residue levels consistently low).

Several methods are used by different field offices in California to estimate utilization. The Interagency Technical Reference, Utilization Studies and Residual Measurements (BLM et al. 1996b), describes these methods.

There are at least two implicit assumptions made when setting management objectives based on utilization and residue. One relates to the vigor of the key species considered to be important to maintaining or improving sites. The assumption is that if these key species are grazed appropriately they will improve in vigor, which will result both in increased production of existing plants and increased recruitment of additional plants. The other assumption relates to the protection of soil: if enough of the vegetation is left after grazing, the soil will be adequately protected from accelerated erosion. These assumptions, while reasonable, need to be reinforced through long-term monitoring. The *levels* of utilization or residue also need to be tested through long-term monitoring (e.g., is 40 percent utilization too high or 500 pounds of residue per acre too low to ensure good plant vigor or good soil protection?).

Most current BLM land use plans allow for utilization of key perennial grass species of 50 percent of the annual above-ground production (some plans specify a range of 40-60 percent utilization). Holechek (1991), however, points out that:

A 50% use level works well in the flat, humid regions of the Great Plains and Southeast because of their high productivity and high adaptability of the plants to grazing. However in most cases it causes range destruction in the rugged, arid ranges of the West. Research shows stocking rates that involve a 30 to 40% forage use level will enhance range recovery, maintain adequate food and cover for wildlife, protect soil resources and will give the highest long term economic returns with the least risk on nearly all of the western range types (see reviews by Holechek et al. 1989, Vallentine 1990).

The recommendations of Holechek et al. (1989 and 1995) and Holechek (1991) are given in Table 3.2.5, along with the sources behind these recommendations.

On annual grasslands, minimum levels of residue are set. Because these communities are dominated by annual species, the residue dries out during the summer (even the above-ground portions of most of the native perennial species, such as the several members of the lily family often present, dry out during this period). The goal is to maintain a certain level of residue, usually called residual dry matter (RDM), until the first fall rains (see the section on Major Vegetation Types for more information on why these RDM levels are important). Short-term monitoring consists of estimating the amount of RDM (in pounds per acre or kilograms per hectare) remaining in key areas during the period when livestock are present. When RDM levels become close or cross the prescribed threshold, livestock are removed from the allotment. Most offices use the comparative yield method (BLM et al. 1996b) to estimate RDM levels, but reference photographs showing the different RDM levels are also used for this purpose.

Table 3.2.5: Utilization guidelines for different range types in the EIS area (adapted from Holechek et al. 1995 and Holechek 1991).

Average Annual Precipitation		Percent Use of Key Species for Moderate Grazing ¹	Range Types	References
cm.	in.			
13-30	4-8	25-35	Salt desert shrubland	Hutchings and Stewart (1953)
13-30	8-12	30-40	Semidesert grass and shrubland	Valentine (1970) Martin and Cable (1974)
13-30	8-12	30-40	Sagebrush grassland	Pechanec and Stewart (1949) Laycock and Conrad (1981)
25-100	10-40	50-60	California annual grassland	Hooper and Heady (1970) Bartolome et al. (1980) Rosiere (1987)
40-130	16-50	30-40	Coniferous forest	Pickford and Reid (1948) Johnson (1953) Skovlin et al. (1976)
40-130	16-50	30-40	Mountain shrubland	Pickford and Reid (1948) Skovlin et al. (1976)
40-130	16-50	30-40	Oak woodland	Brown (1982) ²
25-45	10-18	30-40	Pinyon-juniper woodland	
16-50	20-30	20-30	Alpine tundra	Thilenius (1979)

1 Ranges in good condition and/or grazed during the dormant season can withstand the higher utilization level. Those in poor condition or grazed during active growth should receive the lower utilization level.

2 These guidelines apply to oak woodlands with a perennial grass understory.

Residue is also used to set grazing management objectives for the herbaceous vegetation in riparian-wetland areas. Most of these plants are perennials that remain green throughout the summer. Consequently, objectives normally set minimum stubble height levels instead of production levels. These stubble heights may be set for key species only or for all graminoid plants (grass-like plants, including grasses, sedges, and rushes). Monitoring then consists of estimating the stubble heights at key areas through sampling, and moving livestock from the pasture or making other management changes when minimum thresholds are approached or crossed. See BLM et al. (1996b) for the method used to estimate stubble heights. Qualitative methods such as photographs are also used.

It is also important to estimate utilization on shrubs, where these species are important components of the ecosystem. Areas that support shrub species that are used by livestock and wildlife include: (1) riparian areas, which often support willows and other shrubs; (2)

areas within the sagebrush steppe where bitterbrush and other shrubs are important components; and (3) areas where saltbushes and other related shrubs occur, both in the sagebrush steppe and annual grassland vegetation types. There are three primary methods used to monitor shrub utilization: (1) the twig length measurement method, (2) the Cole browse method, and (3) the extensive browse method. These are described in BLM et al. (1996b).

Analysis, interpretation, and evaluation. Data collected as part of quantitative studies must be analyzed using appropriate statistical methods. Confidence intervals must be constructed around estimates of utilization levels and significance tests applied to trend data to determine if observed changes are significant. The results of this analysis must then be interpreted and evaluated. Recent reviews of monitoring activities conducted by the BLM California State Office have revealed that while much effort has been expended in collecting monitoring data, too little effort has been directed toward analysis, interpretation, and evaluation. In addition, many field offices do not have personnel with the necessary expertise to analyze monitoring data and design monitoring studies that have the power to detect changes that are biologically significant. As a consequence, very few allotment evaluations have been conducted over the past few years, and few management changes have been implemented as a result of monitoring. Steps are being taken to correct this problem, but much remains to be done.

Existing situation. Monitoring and existing data indicate that 387 (60%) of the 649 grazing allotments in the project area meet the fundamentals of rangeland health or are making significant progress toward meeting the standards with current management practices.

59 Allotments were identified as being in Category 1 -- areas where one or more standards are not being met, or significant progress is not being made toward meeting the standard(s), and livestock grazing is a significant contributor to the problem. Some form of livestock management change will be made in those allotments, based upon site-specific needs. In most cases, it is only a small acreage in an allotment that fails to meet the fundamentals.

190 allotments are in Category 3 -- areas where the status for one or more standards is not known, or the cause of the failure to meet the standard(s) is not known. These will be reviewed on a priority basis, as described in Appendix 21.

There were an additional 13 allotments in Category 4 -- areas where one or more standards are not being met due to some other resource use or problem than grazing. As priorities and funding allow, the authorized officers will take appropriate action based on regulation or policy to correct these situations.

Appendix 21 contains a detailed listing of these allotments.

3.3 UPLANDS

3.3.1 Soils

Soil characteristics vary considerably throughout the affected area. Soils which support livestock grazing are six inches to over sixty inches deep; and the soil textures include nearly every category defined, ranging from coarse textured "loamy sand" soils to fine textured "clay"

soils. Similarly, other soil properties which influence vegetation and watershed function, such as permeability, infiltration, fertility, structure, and organic matter content, vary throughout the broad geographic area.

The soil characteristics at any specific site are the result of a number of factors which influence soil formation rates and site stability. Jenny (1980) expressed a relationship for the ecosystem in which the soil is a function of climate, time, parent material, relief, vegetation, and organisms. The soil properties expressed are either in equilibrium with the factors and the ecosystem or changing in response to changes within the ecosystem. Human intervention that modifies any of the factors, vegetation for instance, can have a dramatic effect on this equilibrium.

Most of the affected areas have modern soil surveys which describe the soil characteristics and geographic extent of the various soil types. These soil surveys contain the base line data necessary to define "properly functioning condition" of the soil resource.

The interactions between the physical, chemical, and biological properties of soils and plants strongly influence soil stability and watershed function. Livestock grazing activities can directly affect this interaction and watershed health. Hoof action on soils with optimum moisture content can modify soil structure and compact soil layers. Compacted soil reduces root penetration, seedling germination, water infiltration rates, and biological activity, limiting the soil volume available for moisture retention and plant support, and increasing runoff rates. The results can be changes in the plant species composition, reduction of vegetative biomass production, and increased hillslope and streambank erosion.

Plant litter plays an important role in soil stability, energy flow, and watershed function. Removal of vegetation by livestock grazing can reduce litter production and accumulation. Litter provides surface cover which protects the soil from erosion and contributes organic carbon and nutrients to the soil. Organic carbon is at the base of the soil microorganism food chain. Soil microorganisms release nitrogen, phosphorus and other plant nutrients, and build soil structure and porosity. Seventy percent of ecosystem biodiversity occurs below the soil surface.

Both historic livestock management practices and fire suppression activities have modified plant community composition, often resulting in reduced soil cover and increased bare soil surface area. Increased erosion rates and water runoff rates may occur as a result of this change in equilibrium. The changes will likely continue until another equilibria state or balance is achieved.

The current condition of the soil resources is displayed in Table 3.3.1 - Soil Resource Condition Status. This information was developed at the field level by individual Field Office staff, those individuals with the most current knowledge of local resource conditions and trends. The soil condition standards used for this comparison are those described for each alternative proposed in this document. They include:

1. Soils exhibit functional biological, chemical and physical characteristics that are appropriate to soil type, climate, desired plant community, and land form.

2. Precipitation is able to enter the soil surface and move through the soil profile at appropriate rates. There are little or no development of physical soil crusts/surface sealing, or compaction layers below the soil surface.
3. The soil is adequately protected against accelerated erosion, with sufficient ground cover (plants, rock, gravel, etc.) and sufficient litter/residual dry matter. There is minimal evidence of accelerated erosion in the form of rills, gullies, pedestalling of plants or rocks, or deposition of alluvial or aeolian material. Any such evidence does not exceed the natural rates for the site.
4. The soil fertility is maintained at appropriate levels, as shown by a diversity of plant species (and age classes in perennial areas), with a variety of root depths, is present, plants are vigorous during the growing season, and they represent the desired plant community.
5. Biological soil crusts are intact, and in place, where appropriate.

Table 3.3.1: Soil Resource Condition Status Within Grazing Allotments*		
Acres (1000's) which meet soil condition standards	Acres (1000's) which do not meet soil condition standards	Acres (1000's) with Insufficient Knowledge to Determine
4,168	120	112

* (This data was developed by Field Office staff based upon major known problems. More site specific information will be known as we actually complete inventories of areas using the Rangeland Health standards.)

Those areas where soil conditions fail to meet the standards described in the alternatives are functioning below the thresholds suggested for proper watershed function.

Many Field Offices have areas that are dominated by noxious weeds such as yellow star thistle, medusahead and tarweed. A significant factor in watershed function resulting from this condition is the potential loss of root mass and root depth associated with healthy perennial grasses. This root distribution and mass contributes to fertility, organic matter, water intake, aggregate stability, and erosion reduction. A loss of perennials and replacement with annuals results in less root mass and reduced rooting depth, and may contribute to greater runoff, compaction, increased erosion, and loss of fertility and site capability.

Several allotments in northeastern California are dominated by the noxious weed medusahead and lack a significant component of perennial grasses. This condition is mostly associated with soils that have a heavy clay texture that expands and contracts with changing moisture content. This physical phenomenon creates poor seedling establishment conditions, making native plant recovery difficult and slow. As a result of the greater flammability of the medusahead over perennial vegetation, frequent fires have reduced the shrub component, further altering the vegetative diversity. The trend in condition in these areas is currently static, and is unlikely to be changed by changing grazing management. Other reasons for failure to meet soil standards are recent fire disturbance, improper grazing management, and poor road maintenance by county road crews.

3.3.2 Vegetation

Major Vegetation Types

Livestock grazing occurs in a variety of natural vegetation types within the three major Floristic Provinces recognized by Hickman (1993): 1) the California Floristic Province, 2) the Great Basin Floristic Province, and 3) the Desert Province. This EIS evaluates grazing management in the California and Great Basin Floristic Provinces (see Map 4). Grazing on BLM lands within these two provinces occurs mostly on annual grasslands in the coastal, Great Valley, and Sierran and Cascade foothill regions, and in the sagebrush steppe vegetation of the eastern Sierra Nevada, Modoc Plateau, and intermountain regions. Grazing occurs in riparian and wetland vegetation in both of these provinces.

Many different systems have been devised to classify the vegetation of California. The most recent of these is one by Sawyer and Keeler-Wolf (1995), which classifies vegetation to the level of *series*. Series are defined based on the dominant overstory species. Sawyer and Keeler-Wolf describe more than 250 series for California, and additionally describe other habitat types such as vernal pools. A classification system to be used in conjunction with the California Wildlife-Habitat Relationships (WHR) System is presented in Mayer and Laudenslayer (1988). That treatment recognizes about 50 habitat types, based mostly on vegetation, for the State. Many other systems have been proposed and used to varying degrees. These include those developed by Holland (1986), Keeley (1990), Parker and Matyas (1979), Barry (1989), Munz and Keck (1959), Cheatham and Haller (1975), and Küchler (1977), among others. A useful crosswalk to those classification systems developed before 1988 can be found in de Becker and Sweet (1988).

This document addresses only those California vegetation types found on rangelands¹ managed by the BLM that are under permit or lease for grazing by domestic livestock. For analysis purposes we combine the 14 WHR habitat descriptions found in Mayer and Laudenslayer (1988) that apply to these lands into three major vegetation types: 1) annual grasslands, 2) sagebrush steppe, and 3) wetland-riparian. Table 3.3.2(a) (page 3-31) shows how these major types relate to the 14 WHR types. The table also lists the most representative and widespread vegetation series of Sawyer and Keeler-Wolf (1995) found within each of the three major types. We address annual grasslands and sagebrush steppe below; wetland-riparian vegetation is covered in Section 3.4.2.

From the end of the Pleistocene, some 10,000 to 12,000 years ago, until the introduction of cattle and sheep to California beginning in the 1700s, the grassland ecosystems of the State were devoid of large, ungulate grazers. The native large herbivores, pronghorn antelope, mule deer, and three elk taxa (Roosevelt, tule, and Rocky Mountain elk), are facultative browser/grazers or browsers, and not grazing specialists like cattle (Painter 1995; Vallentine 1990). The types of grazing pressure exerted by these native animals is therefore much different than that applied by domestic livestock.

Some authors (e.g., Edwards 1992; Burkhardt 1996) have pointed out that the herbaceous plant species extant today evolved long before the end of the Pleistocene and, therefore, must have developed resistance to the grazing of the large, now extinct, herbivores present at

¹ Rangelands are lands on which the native vegetation (climax or potential) is predominantly grasses, grass-like plants, forbs, or shrubs (SRM 1989).

that time. Others, however (e.g., Baker 1992; Painter 1992), point out that 10,000-12,000 years is more than enough time for these plant species to have lost whatever resistance to grazing they may have possessed. The renewal buds of bunchgrasses (which were the primary type of grass present in upland grassland communities of California) are exposed at or above soil level where they are not protected from close grazing (Baker 1992). This contrasts with the rhizomatous and stoloniferous grasses common to the Great Plains; these grasses are well adapted to grazing, and their renewal buds can escape even sheep grazing (Baker 1992). In addition, Baker (1992) questions whether any large herbivore in California during the Pleistocene was really a grazer similar to the modern day bison (which did not occur in California; Painter 1995; McDonald 1981). Certainly the lack of resistance to livestock grazing of one of the dominant, presettlement perennial bunchgrasses of the sagebrush steppe, bluebunch wheatgrass (*Pseudoregneria spicata* ssp. *spicata*), is well documented (Mack and Thompson 1982; Anderson 1991).

Despite the degree of resistance to grazing of the native perennial bunchgrasses of California, there is no denying that the annual grasses now naturalized in the California annual grassland vegetation type are well-adapted to grazing by domestic livestock. Thus, in a sense, the "rules have changed" in that vegetation type. Several authors have pointed to benefits to native forbs and native bunchgrasses from properly timed grazing of annual grasses (e.g., Heady 1956, Barrett 1992, Blumler 1992, Edwards 1992, Stebbins 1992), but there is certainly disagreement on this issue (e.g., Belksky 1992; summary in Painter 1995). Ongoing research in the Carrizo Plain by BLM, The Nature Conservancy, and the California Department of Fish and Game seeks to provide an answer to the question of whether livestock can be used as a tool to encourage the expansion of native forbs and perennial grasses into areas now dominated by introduced, naturalized grasses.

Annual Grasslands.

This major vegetation type occurs entirely within the California Floristic Province (Map 4), an area often also referred to as "cismontane California," described by Munz (1979) as those parts of the State lying between the crest of the Cascade-Sierra axis and the coast.² Herbaceous vegetation, usually dominated by annual grass species, is the feature common to this type. These grasslands often occur as treeless expanses in and on both sides of the Central Valley, as well as on ridges and south-facing slopes of the outer Coast Ranges. In the foothills of the Sierra Nevada, Cascade, and Coast Ranges, these grasses also occur as an understory to various tree species, most notably blue oak (*Quercus douglasii*), valley oak (*Q. lobata*), interior live oak (*Q. wislizenii*), and foothill pine (*Pinus sabiniana*). Near the coast, the grasses can form an understory under coast live oak (*Quercus agrifolia*) and other tree species. In the southern San Joaquin Valley these grasslands also occur as understory to shrubs, principally allscale (*Atriplex polycarpa*). Annual grasses can also occur within areas dominated by chaparral and coastal scrub habitats, but usually only for brief periods of time following disturbance, such as fire or mechanical manipulation for range improvement (BLM does not mechanically manipulate chaparral and coastal shrub for range improvement purposes, but other landowners do). Because of the limited extent of livestock grazing within chaparral and coastal sage scrub, those communities are not addressed further here.

² Cismontane also refers to the area of southern California between the coast and the crest of the several ranges that form the divide between desert and coastal drainages. This area of cismontane California, however, is outside the region covered by this EIS.

Native perennial grasses formerly dominated most of the area currently occupied by annual grass species. Purple needlegrass (*Nasella pulchra*) is considered by Heady (1977) to have been the dominant species in most of these grasslands (except near the coast), with many other perennial species occurring as associates, including nodding needlegrass (*N. cernua*), one-sided bluegrass (*Poa secunda* ssp. *secunda*), California fescue (*Festuca californica*), blue wildrye (*Elymus glaucus*), junegrass (*Koeleria macrantha*), and California melic (*Melica californica*). Native annual grasses also occurred, probably in areas disturbed by fire or other forces (Heady 1977). These included annual fescue (*Vulpia microstachys*) and old-field three-awn (*Aristida oligantha*). Near the coast, different perennial grass species dominated, particularly California oatgrass (*Danthonia californica*) and Idaho fescue (*Festuca idahoensis*).

These perennial grasses have been replaced throughout most of their former range by annual grass species native to the Mediterranean region. Burcham (1957) well documents this replacement of the pristine grassland, and Heady (1977) summarizes it. The replacement appears to be the result of complex interactions beginning in the mid-1800's between 1) the invasion by alien plant species; 2) the introduction of domestic livestock, resulting in changes in timing and pattern of grazing; 3) drought; 4) cultivation, and 5) fire (Heady 1977; Burcham 1957). The result was that, by the end of the 19th Century, the nature of the once perennial grasslands had been completely changed.

Stromberg and Griffin (1996) suggest, based on studies at the Hastings Reservation in Monterey County, that past cultivation, including historical disking that may not be at all obvious today, may have had much more of an impact on replacement of native perennial grass stands than previously realized. They note that old fields within the Reservation, ungrazed now for more than 60 years, have remained relatively unchanged, with annual grasses dominating, and few, if any, perennial grasses moving back in. They hypothesize that the initial cultivation eliminated the perennial grasses, and that gopher activity in these old fields has helped to maintain the annual grasses at the expense of the perennials following the cessation of cultivation.

The present-day grasslands are dominated by annual grasses and forbs in the ground layer. Practically all of the annual grasses were introduced from Europe and are now naturalized to the extent that Heady (1977) believes they must be considered "new natives." Common among these are soft chess (*Bromus hordeaceus*), ripgut (*B. diandrus*), red brome (*B. madritensis* ssp. *rubens*), wild oat (*Avena fatua*), slender wild oat (*A. barbata*), European hairgrass (*Aira caryophylla*), dogtail (*Cynosurus echinatus*), along with many others. Annual forbs are also common in the grassland. Some of these, such as filaree (*Erodium cicutarium*), storksbill (*E. botrys*), and various species of mustard (*Brassica* spp.), are, like the annual grasses, introduced from Europe. Many others, however, are natives. These include goldfields (*Lasthenia* spp.), butter-and-eggs (*Triphysaria eriantha*), various species of lupines (*Lupinus* spp.), owl's-clovers (*Castilleja* spp.), clarkia (*Clarkia* spp.), and many more. Also common are native perennial herbs from the lily family, such as blue dicks (*Dichelostemma capitatum*), wild onions (*Allium* spp.), mariposa lilies (*Calochortus* spp.), soap root (*Chlorogalum pomeridianum*), and brodiaea (*Brodiaea* spp.).

Although they do not come close to their former dominance, native perennial grasses have not disappeared from the annual grasslands. Large stands of these grasses are rare, however, and even where they are found annual grasses are intermingled with them. The exception to this is on serpentine substrate, where perennial bunchgrasses often still dominate, except where the soil has been disturbed by gophers (Hobbs and Mooney 1985).

and heavy livestock grazing (Willoughby, unpub. data). Efforts to restore areas within the annual grassland type to perennial grasslands have increased in recent years. The Nature Conservancy (TNC) has been particularly active in some of these efforts at various preserves throughout the State. TNC, BLM, and the California Department of Fish and Game are collaborating in attempting to restore portions of the Carrizo Plain to perennial grassland.

Vegetation Dynamics. The annual grasslands vary in species composition and total production both geographically and temporally. Precipitation is probably the most significant driving force behind both types of variation. With respect to geographical variation, Janes (1969, summarized in Heady 1977) sampled 20 sites along a transect running from the southern San Joaquin Valley north to southern Humboldt County. Soil depth, aspect, and percent slope were similar at each site. Average rainfall, based on data from the weather station nearest each site, ranged from 13 cm in the south to 204 cm in the north. On sites with less than 19 cm of rainfall, red brome and filaree were the dominant species; these species continued to occur in measurable quantities up to about 30 cm of rainfall. Soft chess, ripgut, and storksbill were the most common species above 20 cm of rainfall. Large differences in species composition and production can be found over short distances (McNaughton 1968). In addition to rainfall differences, microtopographical differences are important in explaining these differences (Evans and Young 1989).

Temporal variation is equally apparent in annual grasslands. Tremendous differences in species composition and total production occur at the same site in different years. This is primarily a function of the amount and timing of rainfall and fall temperatures (Pitt and Heady 1978; Sawyer and Keeler-Wolf 1995). Bartolome (1976) and Bartolome et al. (1980) have shown, however, that, in addition to weather, the amount of residual dry matter (RDM) left on a site at the beginning of the fall rains has a marked influence on total production of that site in the following spring. Heady (1977) summarizes research on the influence of RDM on species composition. Sampson et al. (1951) showed shorter species prevail under heavy grazing (low RDM at the beginning of the growing season), whereas taller species dominate with lighter grazing pressure (high RDM at the beginning of the growing season). Table 3.3.2, reproduced from Heady (1977), lists those species usually found in what Heady calls low, middle, and climax stages of succession. These stages correspond roughly to low, medium, and high amounts of RDM, respectively.

TABLE 3.3.2: Plants Usually Found in Climax, Middle and Low Successional Stages*		
Climax	Middle in Succession	Low in Succession
Slender wild oat	American wild carrot (<i>Daucus pusillus</i>) (N)	European hairgrass
Wild oat	Storksbill	Little quaking grass (<i>Briza minor</i>)
Soft chess	Brome fescue (<i>Vulpia bromoides</i>)	Turkey mullein (<i>Eremocarpus setigerus</i>) (N)
Ripgut	Rattail fescue (<i>Vulpia myuros</i>)	Mediterranean barley (<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>)
Red brome	Nit grass (<i>Gastridium ventricosum</i>)	Tarweeds (<i>Madia</i> spp.) (N)
Filaree	Burclover (<i>Medicago polymorpha</i>)	Miniature lupine (<i>Lupinus bicolor</i>) (N)
Medusahead		Clovers (<i>Trifolium</i> spp.) (N)

* These successional stages correspond to high, medium, and low amounts of RDM, respectively, at the beginning of the growing season in the fall. Scientific names are given for those species not discussed in the text. (N) = native species.

Fire likely played an important role in the pristine grassland and was one of the driving forces behind its evolution (Heady 1972). Heady (1977) surmises that burning in the grassland likely decreased following the discovery of gold, because increased cultivation and overgrazing reduced the amount of fuel available. In more recent times fires suppression activities have reduced the extent of fires in the annual grasslands. Heady (1977) maintains that fires in the current annual grasslands have little permanent effect. Where perennial grasses still persist, however, there is at least circumstantial evidence to suggest that repeated burning favors these at the expense of annual grasses. D. Taylor (per. comm.) has studied the grasslands at the Lawrence Livermore Lab's Site 300 facility near Livermore. Grazing was removed from the property in the early 1940's. About half of the acreage has been burned annually in late spring to reduce the fire hazard, while the rest of the facility has remained unburned (except for occasional wildfire). After more than 50 years of no grazing the unburned portion remains dominated by annual grasses such as ripgut and soft chess. The burned portion, though still supporting annual grasses, has what Dr. Taylor describes as some of the best stands of native grassland he has seen in the California Floristic Province. These stands are dominated by one-sided bluegrass.

Fire also appears to provide a tool for eliminating or at least controlling the invasive weed, medusahead (*Taeniatherum caput-medusae*). Although Heady (1977) states that fire is ineffectual in controlling this species, The Nature Conservancy has had considerable success in recent years in eliminating this species from its Jepson Prairie Preserve in Solano County

by burning in late spring, before medusahead, a late-maturing species, has set seed (Pollak and Kan, in press).

In addition to medusahead, yellow-star thistle (*Centaurea solstitialis*) is an important weed pest of annual grasslands. Besides being poisonous to horses, this introduced weed out-competes native plants and reduces biological diversity. Yellow-star thistle is so widespread in the annual grassland that until recently there appeared little hope for control. The U.S. Department of Agriculture and California Department of Food and Agriculture are experimenting with biological control agents. One of these, the hairy weevil (*Eustenopus villosus*), which preys on the seed heads of the plant, was recently released on BLM lands in the Carrizo Plain Natural Area (it has been used on private lands for about the last five years). Fire has also been used effectively. For example, Hastings and DiTomaso (1996) report that three years of burning at Sugarloaf Ridge State Park in Sonoma County have resulted in a 99 percent decrease in the soil seed bank of yellow star-thistle. Victory over this species on a large-scale basis, however, remains many years away.

In the San Joaquin Valley, introduced and native plants serve as hosts to the beet leafhopper, an introduced species that is the vector of curly top virus, an economically important disease of tomatoes, sugar beets, beans, melons, and several species of ornamental flowering plants. Key host plants in the late winter and spring are grassland species, including filaree, annual plantain (*Plantago erecta*), and annual peppergrass (*Lepidium nitidum*). These are species that frequent dry, sparsely vegetated south-facing slopes. These species tend to be more numerous in dry years and/or in areas that are too heavily grazed, and these situations consequently favor the beet leafhopper. During the summer season the most important plant host for the leafhopper is Russian thistle (*Salsola tragus*), which is often the only green, succulent plant remaining on many rangeland sites during that time of the year. Russian thistle usually invades sites that have been physically disturbed. Although many factors such as fires, roads, or surface blading provide opportunities for the invasion of Russian thistle, improper livestock grazing, too, can play a role in its spread.

Vernal Pools. Vernal pools are an important feature of many of the annual grasslands of California. These are small depressions, usually underlain by hardpan, that fill with water during the winter (Holland and Jain 1977). As these pools dry up in the spring, many plant species flower, often forming showy rings around the pool. Many of the plant species found in vernal pools are totally restricted to that habitat. Because of the demanding nature of the vernal pool habitat--requiring species to begin growth while submerged in water--most of the introduced grassland species have not been able to successfully colonize vernal pools. The result is that most vernal pool species are native. Characteristic vernal pool species include various species of downingia (*Downingia* spp.), (*Lasthenia* spp.), coyote-thistle (*Eryngium* spp.), popcorn flowers (*Plagiobothrys* spp.), meadowfoams (*Limnanthes* spp.), water pygmy (*Crassula aquatica*), water-starwort (*Callitriche marginata*), semaphore grass (*Pleuropogon californicus*), and whiteflower navarretia (*Navarretia leucocephala*).

Many vernal pool habitats have been lost to farming and urbanization. As a result, several animal and plant species that live in vernal pools have been listed as threatened or endangered by the U.S. Fish and Wildlife Service.

Barry (1995) reviewed the effects of livestock grazing on vernal pools. While recognizing that improperly managed grazing can have deleterious effects both on vernal pools and surrounding annual grassland communities, she asserts that properly managed grazing

maintains and enhances vernal pool vegetation by preventing the invasion of weedy species. Stone et al. (1988) noted that moderate grazing (defined as leaving at least 300-600 pounds of residual dry matter following grazing) had little impact on members of the rare grass tribe Orcuttieae -- of which two species, slender orcutt grass (*Orcuttia tenuis*) and San Joaquin Valley orcutt grass (*Orcuttia inaequalis*) occur on BLM lands. The only possible exception to this conclusion is Greene's tuctoria (*Tuctoria greenii*), a species that is not known to occur on BLM lands. Zedler (1987), in looking at Southern California vernal pools, concluded that moderate cattle or horse grazing does not seem to threaten the persistence of vernal pool plants. This also was the consensus of vernal pool experts at a January 21-22, 1997, meeting of the U.S. Fish and Wildlife Service Central Valley Vernal Pool Recovery Team, where those present agreed that properly managed livestock grazing is compatible with the recovery of listed and candidate vernal pool plants and animals (John Willoughby, pers. comm.). Certainly the fact that vernal pool habitats continue to function more than 200 years following the introduction of domestic livestock into California is evidence for the compatibility of livestock grazing, at least at certain levels, with vernal pool habitat.

Effects of grazing on shrubs and trees associated with annual grasslands. Although grasses and other herbaceous plant species are considered the most desirable livestock forage and provide the major source of forage for livestock, shrubs and tree species, particularly at the seedling and juvenile stages, often are consumed or trampled by livestock. Some woody species have been negatively affected by the season-long grazing that has historically occurred on annual rangelands. Allscale, a common shrub of annual rangelands in the southern San Joaquin Valley, has been particularly impacted. Its range and extent appears to have been greatly reduced even in the last hundred years. Ian McMillan, long-time cattleman and naturalist in the area, has given the following statement with respect to this species (quoted in Sampson and Jespersen 1963; the "*Atriplex*" referred to in McMillan's statement is *Atriplex polycarpa*, allscale):

As a boy I learned from the old vaqueros, that fat cattle were marketed in early spring off the ranges along the west side of the San Joaquin Valley that were then shrub-grassland with *Atriplex* the dominant shrub. This plant feeds from a deep taproot in the sub-surface strata and puts out succulent, nutritious foliage in the fall months when other forage is dry. It blooms and seeds in late fall. This fall growing habit and the ability to put out new growth in dry years when annual plants fail, makes this plant a 'sitting duck' for intensive year-round grazing practices. On the other hand, when browsed only to the extent of annual increment, the plants thrive, and I know of stands that have been pastured on this basis as long as I can remember....If I were running things in the interests of long term human welfare the *Atriplex* would be given back a big portion of its former domain.

Thus, timing of grazing can allow livestock to make use of annual plant species, while minimizing deleterious use of allscale. Moving livestock from pastures in which these annuals have begun to dry out and before or shortly after their dietary switch to allscale can ensure that adult allscale plants remain vigorous.

Recruitment of new allscale plants appears to be a rather rare, episodic event. Many areas that were devoid of this shrub experienced seedling flushes in 1991, presumably because of the unusual weather pattern of the winter-spring of 1990-1991. Virtually no rain fell in the southern San Joaquin Valley throughout most of the late fall and winter period, when a series

of March storms dropped considerable amounts of rain (the event has been dubbed the "March miracle"). This late rain triggered an explosion of seedlings of allscale. Likely because of reduced competition from annual grasses (very few grasses were to be found that spring) and a relatively mild summer, many of these seedlings have survived into adult plants. This underscores one of the tenants of grazing management in arid environments -- the need to take advantage of these episodic events which may occur on the order of only once every several decades. This has been termed "opportunistic management" by Westoby et al. (1989). Normal grazing during one of these favorable growth years for a desirable species may result in a failure to take advantage of a rare opportunity for range improvement.

Another concern with respect to woody species on annual rangelands has to do with the impacts of livestock grazing on the recruitment of oak species, particularly blue oak and valley oak. Many investigations and studies have looked at the possible negative effect of livestock grazing on the recruitment of these species. Some studies have found that, contrary to popular perception, recruitment is not as rare as once believed (Standiford et al. 1996). Nevertheless, poor recruitment from acorns does occur in many stands as a result of several factors, including: competition from introduced annual grasses; herbivory of seedlings by insects, domestic livestock, and wildlife; and intolerance of shady conditions under dense overstory canopies (Garrison and Standiford 1996). Stand disturbances that create small openings may be necessary for recruitment (Garrison and Standiford 1996).

Holzman (1993) found that blue oak canopy density and basal area at the stand level has increased over the period of 1932-1992 under typical livestock grazing and fire exclusion practices. Davis (1995) looked at changes between 1940 to 1988 at 708 sites in blue oak and blue oak/foothill pine woodland. He found that large changes in tree cover occur within individual stands, but that on the whole the overall cover of blue oaks remained fairly constant over this 48 year period. As he points out, however, this may not be a long enough time period to detect a possible decline in oak cover under present recruitment rates. He also points out that it is possible that the demography of blue oak is much more dynamic than assumed and that existing age and size structure data may not accurately predict future demographic changes.

Sagebrush Steppe

The major vegetation type called sagebrush steppe occurs in the Great Basin Floristic Province, east of the Sierra Nevada-Cascade axis. Sagebrush steppe occupies large areas of the Modoc Plateau in northeastern California, extending eastward into northwestern Nevada and southward on the east side of the Sierra Nevada to the Owens Valley (West 1988). As its name implies, the vegetation type is dominated by various species and subspecies of sagebrush (*Artemisia* spp.), but we also include in this discussion the salt desert vegetation of the pluvial basins (Young et al. 1977), even though these often contain no species of sagebrush. Also included here are communities dominated by northern juniper (*Juniperus occidentalis* var. *occidentalis*) in northeastern California and northwestern Nevada, and by Utah juniper (*Juniperus osteosperma*) and single-leaf pinyon (*Pinus monophylla*) in Mono and Inyo Counties.

The sagebrush steppe vegetation of today is greatly different from that of presettlement times. The pristine vegetation consisted of several species and subspecies of sagebrush, each dominating in different habitats. The most conspicuous sagebrush is big sagebrush (*Artemisia tridentata*), with several subspecies, but other sagebrush species are also

important, including low sagebrush (*A. arbuscula*), black sagebrush (*A. nova*), silver sagebrush (*A. cana* ssp. *bolanderi*), and budsage (*A. spinescens*). Big sagebrush and low sagebrush dominate the largest portions of the sagebrush steppe vegetation within the EIS area, with big sagebrush dominating on deeper soils and low sagebrush dominating on shallow, rocky soils with high clay content (Young et al. 1977).

Several species of perennial grasses co-dominated with both big sagebrush and low sagebrush in the pristine sagebrush steppe. The most important of these was probably bluebunch wheatgrass (*Pseudoroegneria spicata* ssp. *spicata*; West 1988).³ In more moist areas, such as on steep, north-facing slopes, Idaho fescue (*Festuca idahoensis*) was the dominant grass (Young et al. 1977). On drier sites various species of needlegrasses became important, including Thurber's needlegrass (*Achnatherum thurberianum*), western needlegrass (*A. occidentalis*), and Letterman's needlegrass (*A. lettermanii*). On moist alluvial bottomlands basin wildrye (*Leymus cinereus*) was often the dominant grass (Young et al. 1977). This spectacular grass grows to heights as great as 2 meters, and its seeds were an important food source for Great Basin Indians (Young et al. 1977; Cronquist et al. 1977). Indian ricegrass (*Achnatherum hymenoides*) was another important understory grass, dominant in many areas, particularly where soils were sandy.

The presettlement vegetation was not static. Since the end of the Pleistocene, about 10,000 years ago, there have been changes in the altitudinal distribution of plant communities and increases and decreases in the abundance of salt desert species and of upland shrubs and grasses as a result of changes in climate and fire frequency (Miller et al. 1994). However, as noted by Miller et al. (1994), "...since settlement, approximately 150 years ago, changes in plant/animal composition have occurred at unprecedented rates across the [sagebrush steppe] region."

The introduction of domestic livestock beginning in the 19th century greatly altered the pristine vegetation. Severe overgrazing reduced or completely eliminated perennial grasses in many areas. Basin wildrye communities were particularly hard hit (Young et al. 1977), to the extent that vast expanses of bottomlands still have little perennial grass today (except where species of introduced wheatgrasses have been artificially seeded). At least some of these degraded basin wildrye communities, even those with no evidence of the plant, appear to be able to come back on their own with proper grazing practices, such as later spring grazing or initial rest for a few years (Jim Young, pers. comm.). Bluebunch wheatgrass is notoriously ill-adapted to grazing, particularly during the growing season (Mack and Thompson 1982; Anderson 1991). It, too, has been greatly reduced or eliminated from much of its former range.

³ There is some debate over whether bluebunch wheatgrass was in fact the dominant species on most upland sites. Some range scientists now believe the species was dominant on only a few sites, particularly north slopes at mid-elevations (Roger Farschon, pers. comm.). The latest ecological site descriptions prepared by the Natural Resources Conservation Service are decreasing the percentages of bluebunch wheatgrass thought to be present in the climax plant community and increasing the percentages of Thurber's needlegrass. On the other hand, reference sites with anything approaching the climax or potential plant community are very rare and much of what we believe to represent climax vegetation is based on conjecture. Certainly the fact that bluebunch wheatgrass is known to be severely impacted from livestock grazing in the growing season (Anderson 1991) and the fact that it is still found as a dominant on some flats, rocky areas, and south-facing slopes lends credence to it being a more wide-spread dominant before the introduction of livestock grazing (Gary Schoolcraft, pers. comm.).

The result of the removal of much of the perennial grass understory was an increase in cover and density of shrubs, particularly species of sagebrush. West (1988) suggests that the pre-settlement sagebrush steppe was only weakly stable, because of the competitive disadvantage of the perennial grasses as compared to shrubs. Certainly fire was an important agent in keeping shrubs in check: perennial grasses are resistant to most fires, whereas many shrub species, particularly sagebrush, are readily killed (West 1988; Young et al. 1977). Another important agent of change was the native moth, Sagebrush Defoliator (*Aroga websteri*), which also contributed to reducing the dominance of sagebrush. The larvae of this species periodically become so numerous they defoliate large expanses of sagebrush (Young et al. 1977). Besides killing the sagebrush outright, these outbreaks also increase the flammability of sagebrush communities, leading to a greater risk of fire.

The severe reduction in perennial grass understory that was the result of the tremendous grazing pressure of the late 19th and early 20th centuries both reduced the competition of perennial grasses on shrubs and decreased the likelihood of fire. Both of these changes led to a greatly increased dominance of shrubs.

The introduction of invasive weeds, most notably cheatgrass (*Bromus tectorum*), has further reduced the perennial grass component of the sagebrush steppe. Cheatgrass became the dominant understory plant in much of the sagebrush steppe by the 1940s and 1950s (Mack 1981; West 1988). Cheatgrass out-competes the native perennial grasses by its ability to germinate in the fall and add root tissue throughout the winter (Harris 1977). It poses the greatest threat to salt desert shrub sites and low precipitation sites dominated by Wyoming sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). More recently, medusahead (*Taeniatherum caput-medusae*) has invaded large areas of sagebrush steppe, principally on the heavy clays of low sagebrush sites. The addition of the fine fuels provided by cheatgrass and medusahead calls the future of even the shrubs on some sites into question. Fires are more likely to occur on these sites than they were even when perennial species were ungrazed. The first fire results in a decrease in sagebrush and an increase in shrubs that have the ability to resprout after fires, such as rabbitbrush (*Chrysothamnus* spp.). As fires become more and more frequent, even these shrubs disappear and the site becomes completely dominated by annuals. Annual grasses do not provide nearly the soil protection of perennial species, particularly in drought years. As West (1988) points out, this results in severe soil erosion during summer convectional storms and a downward spiral of degradation.

Species of shrubs other than sagebrush are also important in the sagebrush steppe vegetation type. Bitterbrush (*Purshia tridentata* var. *tridentata*) co-dominates with both big and low sagebrush in some areas (Young et al. 1977). It is the most important wildlife browse species of this vegetation type (Nord 1965). Other important shrub species in the sagebrush shrub vegetation type include those of the salt desert scrub, discussed below, and those that belong to what Young et al. (1977) refer to as mountain brush communities. Mountain brush communities are those Great Basin plant communities that occur at high elevations and are composed of several species of shrubs. Bitterbrush is one of these. Others are curl-leaf mountain mahogany (*Cercocarpus ledifolius*), Utah service-berry (*Amelanchier utahensis*), and snowberry (*Symphoricarpos rotundifolius*).

Grazing effects on shrubs in the sagebrush steppe vegetation type. Several shrubs in the rose family (Rosaceae) are palatable to both wildlife and livestock. The most important of these is bitterbrush. Bitterbrush provides important browse for big game species, as well as

small mammals and both game and nongame birds (Dittberner and Olson 1983). It is also utilized by livestock. Much recent attention has focused on the health of bitterbrush stands, particularly in northeastern California and northwestern Nevada, and the relationship of these stands to the health of mule deer herds. Heaviest use of bitterbrush by mule deer occurs a short time before the leaves are shed in late fall (Sampson and Jespersen 1963). This is also the time of year during which the nonstructural carbohydrate reserve is highest; browsing during this period is therefore least damaging to the plant (McConnell and Garrison 1966). Domestic livestock will browse the plant in summer and early fall, when most of the herbaceous species have begun to dry out and are less palatable. Cattle normally make no use of bitterbrush in the spring. Over-utilization, whether by livestock, mule deer, or a combination of both, results in thinning of stands (Lassen et al. 1952).

There are a number of studies evaluating the impact of browsing on bitterbrush. Urness and Jensen (1982) reported on a study assessing the impact to bitterbrush by goats (which have browsing patterns similar to sheep). They found that fall browsing of bitterbrush by goats at 100 percent of the annual growth resulted in an increase in the average leader length the following year (55.6 cm as opposed to 7.4 cm in unbrowsed controls), but an order of magnitude reduction in the number of buds and twigs. The actual production increased by 719 percent. Jones (1983), in a manual clipping and mowing study, found that bitterbrush responded to these treatments with increased growth. He states "the more heavily the bitterbrush was pruned, the better it responded to increased growth." However, he also estimated 5 to 8 percent bitterbrush mortality, but he does not specify if this mortality was increased by heavier clipping levels. Fall mowing resulted in a four-fold increase in leader lengths the following year, as opposed to only a two-fold increase from spring mowing. This is consistent with the changes in the amount of available, nonstructural carbohydrates in bitterbrush found by McConnell and Garrison (1966).

Although heavy browsing, particularly when it occurs before fall, stimulates increased production of individual plants, it can also result in shorter shrub life and fewer shrubs surviving to the age of maximum production (McConnell and Smith 1977). Safe utilization (by all animals combined) is considered to be less than 60 percent of current twig length each season (Sampson and Jespersen 1963), although, as we have seen, heavy use in late fall is of less concern than heavy use earlier in the growing season.

There are several examples of bitterbrush stands within the EIS area that are in a decadent condition. These stands receive very heavy use from a combination of deer and livestock, and their current condition may be due to this overuse. It is also possible, however, that old age may be the predominant factor. Hart (1988) attributed a bitterbrush die-off near Ravendale, California, to the old age of the stands.

Bitterbrush reproduces primarily from seed. Rodents play an important role in bitterbrush reproduction by caching the seed in groups of 10 to 100 in storage areas. Although they return to caches to eat the seeds or graze on emergent seedlings, they may miss caches or may not graze every seedling in a group. It has been estimated that up to 50 percent of mature shrubs originated from rodent caches (Martin and Driver 1983). Recruitment of new bitterbrush plants requires the convergence of several conditions (USDA Forest Service 1997): (1) a heavy seed crop; (2) a balanced rodent population (i.e., enough to cache seed, but not so many that all seeds and seedlings are consumed); (3) good spring soil moisture; and (4) circumstances favorable for early seedling growth. In some areas all of these conditions occur only about once every 20 years (USDA Forest Service 1997). When these

episodic recruitment events occur it is important to take advantage of them through "opportunistic management" (Westoby et al. 1989) by reducing or eliminating livestock and controlling use by mule deer and other game animals as needed to allow these seedlings to become established plants.

Bitterbrush is a widespread increaser species on loamy to sandy soils on much of the Great Basin. On public lands subjected to livestock grazing, the most important bitterbrush site is on upland loams in the 12-16 inch precipitation zone. Prior to the introduction of domestic livestock, bitterbrush was probably a minor component of this site, and most of the area covered by this site was likely a sagebrush steppe, dominated by sagebrush, bluebunch wheatgrass, and Idaho fescue. Livestock grazing reduced the bunch grass competition, opening the site for colonization by other species, and reduced the fire frequency. Bitterbrush took full advantage of this opportunity and became a dominant or subdominant shrub on thousands of acres (see Gruell 1986). Based on the recent remeasurement of bitterbrush transects originally measured in the 1950s, Eric Loft (pers. comm.) concludes that existing stands in northeastern California are maintaining themselves.

Salt desert scrub. Landforms below the maximum shorelines of the pluvial lake basins within the area of sagebrush steppe support very different plant communities than those discussed so far (Young et al. 1977). Big sagebrush and low sagebrush are greatly reduced in importance, if they are present at all. Taking their place are other species of shrubs, including shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus vermiculatus*), winter fat (*Krascheninnikovia lanata*), budsage, and spiny hop-sage (*Grayia spinosa*). Many of the same grass species discussed previously occur here as well, particularly Indian rice grass and basin wildrye. An additional grass species is saltgrass (*Distichlis spicata*). These communities experienced the same grazing pressures as the big sagebrush and low sagebrush plant communities, with the consequence that basin wildrye and other perennial grasses have been greatly reduced or have disappeared altogether from many areas. In addition, budsage and winter fat are very palatable to livestock, particularly sheep. These, too, have been greatly reduced from pre-settlement numbers.

Salt desert scrub communities have also experienced invasion from invasive weeds. In addition to cheatgrass, which is also a problem in these communities (see above), tumbled mustard (*Sisymbrium altissimum*) and clasping-leaved peppergrass (*Lepidium perfoliatum*) have invaded salt desert scrub sites. Although apparently posing a more extensive problem elsewhere in the Great Basin, weedy species such as Russian thistle (*Salsola tragus*), halogeton (*Halogeton glomeratus*), and annual, nonnative saltbush (*Atriplex* spp.) and pigweed (*Chenopodium* spp.) tend to invade only physically disturbed sites in the salt desert shrub communities of California.

As mentioned, livestock browse on several shrubs found in salt desert scrub communities, including winter fat, budsage, and some of the salt bushes (*Atriplex* spp.). Clary and Holmgren (1987) evaluated studies conducted on the Desert Experimental Range in Utah to determine long-term vegetation trends in these communities. They found that, because of differences in study methods, weather, grazing treatments, and viewpoint, it was impossible to draw many conclusions. They did find, however, that spring grazing increased shadscale and eliminated budsage at every grazing level. Fall grazing has the opposite effect. Winterfat appears to have declined under both the fall-winter grazing and no grazing treatments.

Not a large amount of these types of communities is grazed within the EIS area. Where livestock grazing in these communities does occur, it takes place primarily in the spring, when the grazing animals prefer grasses.

Juniper and pinyon woodlands. Woodlands of pinyon and/or juniper occur adjacent to sagebrush steppe at higher elevations. Extensive woodlands dominated by western juniper occur on the Modoc Plateau of northeastern California and the Great Basin of northwestern Nevada. The extensive pinyon-juniper woodlands of the Great Basin of Nevada extend into the mountainous areas east of the Sierra Nevada, from Alpine county south (Vasek and Thorne 1977). Throughout this area, woodlands consist of single-leaf pinyons alone, of Utah junipers alone, or as a mixture of the two. Pinyon also occurs on the lower east slopes of the Sierra, where it occurs without Utah juniper in an almost continuous band from Topaz Lake at the Nevada state line south to Kern County (Vasek and Thorne 1977). Where both single-leaf pinyon and Utah juniper occur together, they usually co-dominate at intermediate elevations, with Utah juniper extending by itself to lower elevations and single-leaf pinyon occurring by itself at higher elevations. An exception is the region south and west of Bodie, where Utah junipers occur at the upper elevational margin of a single-leaf pinyon woodland (Vasek and Thorne 1977).

Single-leaf pinyon and both species of junipers have increased greatly since pre-settlement times. This is particularly true of western juniper on the Modoc Plateau, where trees have encroached significantly into communities formerly dominated by sagebrush species. West (1984 and 1988) believes that much of the pinyon-juniper and juniper woodland of the Great Basin was formerly more like a savannah, with older trees restricted to rocky and steep areas, where fires did not reach. Elsewhere the fine fuels provided by understory perennial grasses were sufficient to ensure fires at a frequency that removed juvenile and younger age-class trees from the community. Heavy livestock grazing removed or greatly reduced these fine fuels, leading to a decrease in fire frequency and a consequent increase in the number and cover first of shrubs, especially sagebrush, and then of junipers. Fire suppression policies have also greatly decreased the role of fire in these communities. The result has been that junipers have increased in density both up and down slope into sagebrush steppe.

The understory of the pristine juniper woodlands was very similar to the adjoining sagebrush steppe (West 1988). As juniper density increased over the last ~100 years, however, the understory was much reduced, both in numbers of species and degree of cover. There are large areas on the Modoc Plateau where western juniper is so dense there is no shrub or herbaceous perennial understory whatsoever. The only plants present in the understories are annuals, primarily cheatgrass, and even these exhibit low cover and vigor. West (1988) notes that because of extensive root systems, shading, and germination-inhibiting chemicals in their leaves, junipers are at a distinct competitive advantage over other species. Because the interspaces between trees are devoid of much ground cover, erosion rates in juniper and pinyon-juniper woodlands have accelerated beyond those of the sagebrush steppe. Carrara and Carroll (1979) have demonstrated that soil erosion rates in pinyon-juniper woodland in the Piceance Basin of Colorado have increased 400% during the past century.

Efforts have been made to control the spread of junipers. Prescribed burning is a valuable tool, but it is effective only with younger age-class junipers, because prescribed burns are not usually hot enough to kill older trees. Mechanical removal of junipers has also been used, including fuel wood harvest and chaining. Although locally effective, these practices have not done much to stem the overall spread of junipers into sagebrush steppe. An additional

problem is that, once the junipers have reached a density that has eliminated most of the understory, removal of the trees through any method usually results in a community dominated solely by cheatgrass or other annual plants unless the removal is followed by a restoration effort. This is because seed banks and other sources of perennial grass seed have been lost (Koniak and Everett 1982). This result is probably even more undesirable than the juniper woodland.

Although fire and overgrazing have doubtless contributed to the expansion of pinyon-juniper and juniper woodlands, there is evidence that climate, too, has played a major role. Some scientists now think that the spread of junipers into sagebrush steppe in northeastern California and eastern Oregon may be correlated with the more moist period of the last 100 years (Richard Miller, pers. comm.) paralleling the expansion of mesquite (*Prosopis* spp.) into the grasslands of the southwestern deserts of New Mexico and Texas.

Blackbrush Scrub. In Inyo County, where the Great Basin and Mojave Desert merge, is a locally important community dominated by blackbrush (*Coleogyne ramosissima*; this shrub is also called blackbush), a shrubby member of the rose family. Blackbrush is often the only shrub in this community, and herbaceous understory species are few; total vegetation cover, however, is often high (West 1988). Perennial grasses, including galleta (*Pleuraphis jamesii*), Indian rice grass, and various species of needlegrass (*Achnatherum* spp.), do occur in this community, where they have not been removed through heavy livestock grazing. Once these understory species are removed from a blackbrush community, they will not re-occur unless the blackbrush is removed; thus, we often see closed communities of blackbrush that last for decades, unless disturbed by fire.

This community is very prone to fire (West 1988), and fire was doubtless important in its evolution (Bates and Menke 1984). Blackbrush does not resprout following fire and reseeds itself with difficulty (West 1988). Where few to no perennials occur in the understory, burning results in at least temporary replacement of blackbrush with annual grasses such as cheatgrass and red brome. When this happens, fire frequencies increase, leading to possible long-term removal of the perennial component of this community, decreased productivity, and increased soil erosion. Surface disturbances have similar affects upon the community as fire, in that once the blackbrush is removed, other species such as annuals, perennial grasses and rabbitbrush may invade the site with little likelihood that blackbrush will reinhabit the site for many years.

Pure blackbrush communities are normally avoided by livestock due to the absence of any appreciable amount of palatable forage. However, once a site is disturbed, herbaceous species usually move in quickly, attracting grazing animals once again. If the grazing is not properly managed, the site may eventually be overgrown with blackbrush again.

Table 3.3.2(a): Vegetation types compared to wildlife habitat and vegetation series descriptions.		
Vegetation Type as described in this document	Corresponding Wildlife Habitat Type as described in Mayer and Laudenslayer (1988)	Representative and widespread Vegetation Series as described by Sawyer and Keeler-Wolf (1995).*
Annual Grasslands	Annual Grasslands Alkali Desert Scrub Valley Foothill Hardwood Blue Oak Woodland Valley Oak Woodland Coastal Oak Woodland Valley Foothill Hardwood-conifer Blue Oak - Digger Pine Montane Hardwood Chamise-Red Shank Chaparral Mixed Chaparral	California Annual Grassland Series Purple Needlegrass Series Vernal Pools Shadscale Series Iodine Bush Series Greasewood Series Foothill Pine Series Blue Oak Series Valley Oak Series Interior Live Oak Series Black Oak Series Tanoak Series Oregon White Oak Series Canyon Live Oak Series Chamise Series Eastwood Manzanita Series Wedgeleaf Ceanothus Series Chamise-Wedgeleaf Ceanothus Series Scruboak-Chamise Series
Sagebrush Steppe	Sagebrush Bitterbrush Low Sagebrush Pinyon-Juniper Juniper	Big Sagebrush Series Low Sagebrush Series Bitterbrush Series Curlleaf Mountain-Mahogany Series Rabbitbrush Series Black Bush Series Cheatgrass Series Western Juniper Series Utah Juniper Series Single Leaf Pinyon Series Single Leaf Pinyon-Utah Juniper Series

Table 3.3.2(a): Vegetation types compared to wildlife habitat and vegetation series descriptions.

Vegetation Type as described in this document	Corresponding Wildlife Habitat Type as described in Mayer and Laudenslayer (1988)	Representative and widespread Vegetation Series as described by Sawyer and Keeler-Wolf (1995).*
Wetland-Riparian	Valley Foothill Riparian Montane Riparian Wet Meadow Fresh Emergent Wetland	Fremont Cottonwood Series California Sycamore Series Arroyo Willow Series Narrowleaf Willow Series Sandbar Willow Series Aspen Series Black Cottonwood Series Sedge Series Nebraska Sedge Series Spikerush Series Shorthair Sedge Series Cattail Series Bulrush Series

* No attempt is made to include all applicable vegetation series from the latter source; rather, only those thought to be the most important or most representative of the vegetation types represented in this document are included.

3.3.3 Upland Conditions and Trends

Conditions and trends on BLM rangelands have been reported in a variety of ways over the years. For the past two decades or so the system used by BLM has been substantially the same as that employed by the National Resource Conservation Service (NRCS, formerly the Soil Conservation Service, SCS). The method used is that described in the National Range Handbook (SCS 1976). The BLM has modified the method slightly (BLM 1984) but the basic principles are the same. Differences are primarily in terminology: for example, NRCS uses the term *range site* instead of the *ecological site* used by BLM; NRCS uses the term *range condition*, whereas BLM uses *ecological status*. As long as one is dealing with rangelands these terms are synonymous.

Under this system rangelands are classified into ecological sites. An ecological site is a kind of land with a specific potential natural community and specific physical site characteristics, differing from other kinds of lands in its ability to produce vegetation and to respond to land management.⁴ The potential natural community (PNC) for each ecological site is described (usually by NRCS) based on vegetation sampling of an undisturbed expression (or, as is often the case, a *relatively* undisturbed expression) of the site's vegetation in another place. An inventory, called an *ecological site inventory*, is then conducted.

⁴ NRCS uses the term *range site* in lieu of ecological site. When it applies to rangelands, a range site is the same as an ecological site. The difference between the two concepts, which will not concern us here, is that range sites apply only to rangelands, whereas ecological sites can apply to woodland and forest sites as well as to rangelands.

Ecological site inventory (ESI) consists of collecting a broad array of information on a given area. The information includes data on soils, vegetation, site history, physiography, and erosion. Of these, soils and vegetation are given paramount importance. Information collected in a given area is extrapolated to other areas based primarily on soils. Thus, several areas can be said to belong to the same ecological site because they have the same soil series (or phase of soil series) even though their current vegetation is different (sites may be further defined based on inches of precipitation). The assumption is that the vegetation of all the areas belonging to one ecological site would be the same if the plant communities on each of these areas were allowed to progress to climax. The fact that the existing vegetation of these areas is different is attributed to the presence of several stages of succession, as well as to different possible expressions of the same stage (see, for example, Huschle and Hironaka 1980).

Ecological site inventory is founded on the work of Dyksterhuis (1949) and is similar in many respects to the habitat type concept of Daubenmire (e.g., 1952; 1970). The method has been attacked because of an underlying assumption that the climax plant community is the best possible community for all uses. This assumption is exemplified in NRCS's use of the terms "poor," "fair," "good," and "excellent" to describe plant communities that are least similar to most similar, respectively, to climax. BLM has avoided this problem by substituting the terms "early seral," "mid seral," "late seral," and "potential natural community (PNC)," respectively, in accordance with the recommendations of the Range Inventory Standardization Committee of the Society for Range Management (RISC 1983).

Range condition (this is called ecological status by BLM, but for simplicity we will refer to it as range condition) is determined based on the percent similarity of the present plant community to the potential plant community. Table 3.3.3 shows the four condition classes used by BLM and NRCS and the percent similarity corresponding to each.

Table 3.3.3: Range condition and ecological status designations corresponding to different levels of similarity of the present plant community to the potential natural community (PNC).		
Similarity of Present Plant Community to PNC	Range Condition (as used by NRCS)	Ecological Status (as used by BLM)
76-100%	Excellent	PNC
51-75%	Good	Late Seral
26-50%	Fair	Mid Seral
0-25%	Poor	Early Seral

Trend can also be determined using this method by comparing the results of a subsequent inventory to the initial inventory. If the later inventory shows the plant community to be more similar to the PNC the trend is up. If it is less similar the trend is down. If there is no change, the trend is stable.

Because of constraints of time and budget (as well as the applicability of ecological site inventory to annual rangelands--more on this below), BLM in California has conducted ecological site inventory on slightly less than 1.3 million acres of the 4.4 million acres under

grazing permit and lease in the project area. Of the acres inventoried using ESI, almost all were inventoried in order to prepare environmental impact statements to comply with the nationwide court order in *National Resource Defence Council, Inc. v. Morton* (388 F Supp 829, 1974; 527 F 2d 1386, 1976). The last of these "grazing EISs" was completed in 1985. Thus, ecological site inventories for California rangelands are 12 or more years old (except for some smaller areas that were re-inventoried in later years). Table 3.3.3(a) shows the status of ESI in the project area.

Table 3.3.3(a): Status of ecological site inventory in the project area. Acres and years of inventory are shown by Field Office and by planning unit within each Office's jurisdiction.

Field Office	Planning Unit	Year(s) of Inventory	Acres Inventoried
Bishop	Bodie-Coleville	1979-1980	227,068
Eagle Lake	Cal-Neva	1979 ⁵	651,405 ⁵
	Willow Creek	1980 ⁶	294,992 ⁶
Redding	Redding	1981	13,558
Surprise	Cowhead-Massacre	1981	101,486

Problems with the use of Ecological Site Inventory (ESI) to determine range condition.

The ecological site inventory approach is based on the successional theory of Clements (1916), as applied to rangelands by Dyksterhuis (1949), and further refined by the Soil Conservation Service (SCS 1976). Important assumptions of the approach include (Willoughby 1992): (1) that each ecological site has only one climax, steady state plant community; (2) that secondary succession is simply the reverse of retrogression and proceeds through a series of predictable seral communities; (3) that pioneer species facilitate the invasion and establishment of later seral species; (4) that succession proceeds in a steady, continuous fashion; and (5) that climate remains relatively stable, at least over periods of many decades to hundreds of years. All of these assumptions are severely challenged by current successional theory (see, for example, Connell and Slatyer 1977; Noble 1986; Noble and Slatyer 1980; MacMahon 1980; Niering 1987; Cattelino et al. 1979; Smith 1988 and 1989; Glenn-Lewin 1980; Holling 1973; Walker et al. 1981; Westoby et al. 1989; Friedel 1991; Laycock 1991; and Svjekar and Brown 1991).

Another problem with Ecological Site Inventory is that, although it gathers valuable information, it does not collect certain critical information necessary to determine whether uplands are healthy or in proper functioning condition. The concept of proper functioning condition of uplands is relatively new (the concept is much better developed for riparian areas, where it will be discussed in detail), but its assessment requires information on soil

⁵ Some of this area was re-inventoried in 1987, when 53,745 acres were inventoried, and in 1994, when another 40,000 acres were inventoried.

⁶ In 1988, 32,477 acres of this total were re-inventoried.

stability and the integrity of ecological processes such as nutrient cycling and energy flow (National Research Council 1994). Although a team of professionals is currently developing ways of incorporating these informational needs into BLM inventory procedures, this has not yet been accomplished, and none of the range condition and trend assessments given below include this type of information.

Current Known Upland Conditions and Trends. Although, as noted above, current methods of assessing range conditions and trends are inadequate to completely evaluate upland rangeland health or proper functioning condition, they provide the only information currently available. The BLM reports annually on the condition and trend of its rangelands. Where available, this information comes from ecological site inventory. As Table 3.3.3(a) shows, however, only 1.3 million acres out of the 4.4 million acres under grazing permit and lease have been inventoried using this methodology. In order to assess the condition and trend of the other 3.1 million acres, a variety of methods has been used. In some areas different inventory methodologies have been employed. In other areas the professional judgement of range conservationists and other resource specialists has provided the best available information.

In the sagebrush steppe vegetation type range condition is based on the nearness of the current plant community to the presumed climax plant community (see Table 3.3.3). In the annual grassland vegetation type a different procedure has been employed. Because this vegetation type is dominated by annual plant species, the traditional model of succession, which ends in a stable plant community dominated by perennial species, is not applicable. Therefore, annual rangelands have been classified as being in "good" condition, unless problems with noxious weeds or erosion have been evident, in which case they have been classified in a lower condition class. In a few areas within the annual grassland type, perennial species are present in sufficient numbers to classify using traditional notions of succession, and these areas have been classified in that fashion.

Some formerly poor-condition rangelands have been seeded to introduced perennial grasses that provide erosion control and livestock forage. These seedings have mostly been done in the sagebrush steppe vegetation type. Following the removal of the woody overstory (primarily sagebrush) by wildfire or, more rarely, by chemical treatment, perennial wheatgrasses, including desert crested wheatgrass (*Agropyron desertorum*), intermediate wheatgrass (*Elytrigia intermedia*), and tall wheatgrass (*Elytrigia elongata*), all of which are native to Eurasia, were planted. These seedings are rated using professional judgement as to their forage value (called forage condition).

Trend in uplands is even more important than condition when using the method of condition assessment described in detail above. This is because of the relatively slow rates of change in rangeland vegetation, particularly in the sagebrush steppe vegetation type where these concepts of condition and trend most directly apply. Even under conservative stocking levels and exclusion most rangelands would not improve to the next condition class for many decades. Thus, trend is a more sensitive measure of management success.

Three categories of trend are recognized: Up (moving toward the potential natural community), Static (not moving toward or away from the potential natural community), and Down (moving away from the potential natural community). A fourth category, Undetermined, is used for those rangelands where the trend has not been assessed recently.

Trend is assessed on BLM rangelands in California in one of three ways. Where more than one ecological site inventory has been completed in the same region, the results of the second inventory are compared to the results of the first to determine trend. For example, in the first inventory, the area of a particular ecological site in a given pasture may be measured to be 30% similar to the potential natural community (PNC) for that site. The ecological status of this area would be rated as mid seral (or, in NRCS terminology, as fair condition). Ten years later, a second inventory is conducted. Now the same area is measured to be 45% of the PNC. This is still the same condition class, mid seral, but the trend is clearly up.

Although this method probably is the best means of assessing trend under a system that compares existing vegetation to the potential vegetation for an ecological site (but don't forget the overall limitations of this approach, discussed above), it is the method that has been least used. The reason for this is that few rangeland areas in California have been inventoried twice using ESI. In fact, only slightly more than 125,000 acres have been "re-inventoried" using ESI; all of these acres are managed by the Eagle Lake Field Office. For the remaining almost 4.3 million acres, either the concept of "apparent trend" or monitoring data have been used to assess whether the plant community is moving toward or away from the PNC. Apparent trend is the interpretation of trend based on a single observation, using such factors as plant vigor, the abundance of seedlings and young plants, and the accumulation or lack of plant residues (SRM 1989). This determination is made during a rangeland inventory (using either ESI or another inventory method) or by professional judgement.

Monitoring provides another means of estimating trend. Trend monitoring involves the estimation of plant attributes, especially cover and frequency, at key areas (see Section 3.2.5, Monitoring, for a discussion of cover and frequency measurements, as well as the key area concept). A determination of trend involves assessing whether species that are considered to be part of the PNC are increasing or decreasing. Estimates at key areas are extrapolated to include larger areas of pastures or allotments.

Just as for condition, the concept of trend does not really fit well in stable communities dominated by annuals. Therefore, offices have generally reported the trend of annual rangelands to be static unless there are, or have been, problems associated with noxious weeds and/or accelerated erosion. In a few areas within the annual grassland type, perennial species are present in sufficient numbers to classify using traditional concepts of succession. Trend has been determined in these areas based on the methods described for sagebrush steppe rangelands.

Tables 1 through 6 in Appendix 7 show rangeland conditions and trends as of September 30, 1996.

But remember, when we talk about trend and condition as it has been used by BLM, NRCS and others, we are not talking about rangeland health or proper functioning condition (which is what we need to discuss). What we are talking about is whether a site is moving towards a climax vegetative community (which may not be the desired state). In many cases, we are managing for, and desire, a lower seral stage, or a mix of stages spread over the landscape. So, although we may say that the condition is poor, with no upward trend, this does not necessarily mean that these areas are in poor health, but rather that they are at a low seral stage.

3.4 RIPARIAN-WETLANDS and STREAM CHANNELS

3.4.1 Overview

Wetland/aquatic areas comprise less than 1 percent of the 15.9 million acres of public lands administered by the Bureau of Land Management in California. BLM manages 62,000 acres and 3,500 miles of wetlands statewide, and 13,593 acres and 1,163 miles of wetlands in the area covered by this EIS (see Table 3.4.1).

The benefits of these vital areas, however, far exceed their relatively small acreage. Wetland/aquatic habitat is one of the most fundamental resources of the public lands. The water sources contained in these habitats serve as the foundation upon which many species depend. An estimated one-half of the animals and one-third of the plants currently listed in the U.S. as endangered or threatened depend on wetland/aquatic areas for their survival.

Table 3.4.1: BLM California Estimated Wetland Acres and Aquatic/Riparian Miles (most recent data available)			
	Acres Land Administered	Standing-water Wetland (Lentic) Acres	Flowing-water Riparian / Aquatic (Lotic) Miles
Area Administered by BLM California	15,900,000	62,000	3,500
Area Covered by this EIS, within Grazing Allotments	4,370,000	13,593	1,163

In recent years, there has been increasing awareness and understanding of the numerous economic benefits wetland/aquatic areas provide to humankind. Healthy wetland systems purify water as it moves through the vegetation and act like a sponge by retaining water in stream banks and ground water aquifers. Wetland/aquatic areas can absorb and dissipate the energy of flood waters before they reach high value areas such as urban lands.

Wetland/aquatic areas also are focal points for recreation, including fishing, hunting, camping, boating, hiking, nature observation, photography, and picnicking. Many of these activities associated with wetland/aquatic areas generate high economic values.

Within a landscape, wetland/aquatic areas are linked to both upstream and downstream ecosystems, and their functional values (e.g., flood storage, water supply, wildlife habitat) extend well beyond the boundaries of the wetlands/aquatic areas themselves. In California, wetland/aquatic area habitat functions extend to other continents, as is the case for 60 percent of migratory birds using the Pacific flyway.

In California, the BLM manages four major types of wetlands: 1) riparian, 2) marshes, 3) wetland flats/playas, and 4) vernal pools. Riparian wetland areas are grouped into two major categories: 1) lotic, which is running water habitat (including stream channel and floodplain)

such as rivers, streams, and springs; and, 2) lentic, which is standing water habitat (including shorelines and floodplain) such as lakes, ponds, and meadows.

Marshes are frequently or continually inundated areas characterized by emergent herbaceous vegetation adapted to saturated soil conditions. Wetland flats/playas are similar to a marsh; however, they are very shallow and are seasonally and intermittently flooded.

Vernal pools are depressions that have impervious substrata (clay soils, hardpan, or bedrock). This substrata decreases the infiltration of water and results in areas that are saturated long enough to impose special constraints on plant growth. Many vernal pools have surface water only during the most extreme precipitation events and may persist only a few days, while others may persist up to several months.

The amount of scientific data and history of BLM managed wetland/aquatic habitats varies greatly by location. Some areas (i.e. Mattole River Estuary) have long-term research conducted within the area. However, in other areas information is lacking. The best information available on wetland/aquatic habitats for this EIS is Functioning Condition Assessment data. There are three categories of functioning condition: 1) proper functioning condition, 2) functional-at-risk condition, and 3) non-functional condition. Detailed definitions of these categories are available in BLM's Technical References 1737-9 and 1737-11.

Simply put, the Functioning Condition Assessment process is an evaluation of the health or change of health status of wetland areas. The results of this assessment do not indicate if management objectives are being achieved. However, if an area is not in proper functioning condition it does not have the potential to achieve management objectives. See Table 3.4.1(a) for functioning condition status of wetland/riparian habitats covered by this EIS.

The major stream channel and riparian attributes that are assessed when determining functional condition are hydrologic, vegetative, and soils/erosion. Livestock grazing can impact all of these attributes. For example, livestock could consume enough of the streambank vegetation that there would not be adequate vegetation cover to protect stream banks during high flows. If a stream was not rock armored along its banks and there was not adequate vegetation, the streambank and associated riparian habitat may erode into the stream channel during high flows. This erosion/sediment might be more than the stream channel could handle and cause the channel to decrease in depth and widen. If a stream channel does not have the correct width/depth ratio for the landscape setting in which it occurs, then the stream cannot provide the proper habitat for the fish, frogs, insects, etc., that should occur in that stream.

Table 3.4.1 (a): Functioning Condition Status of Lentic and Lotic Habitats Covered by Range EIS ⁷		
Condition	Standing-water (Lentic) Wetland Acres	Flowing-water (Lotic) Riparian/Aquatic Miles
Proper Functioning Condition	3631 (26.7%)	319 (27.5%)
Functional-at-Risk	9667 (71.1%)	807 (69.3%)
Non-functional	295 (2.2%)	37 (3.2%)
TOTALS	13,593	1,163

3.4.2 Wetland-Riparian Vegetation

Wetland-Riparian vegetation occurs in both the California and Great Basin Floristic Provinces. This vegetation type is dependent upon the water provided either by the running water of rivers, streams, and springs (*lotic* habitat) or by the standing water of lakes, ponds, seeps, bogs, and meadows (*lentic* habitat). The vegetation of riparian-wetland areas usually contrasts sharply with the vegetation of the adjacent uplands. Although the area covered by wetland-riparian vegetation is small compared to upland vegetation, the importance of this vegetation to a variety of resources is well recognized. For example, more species and greater numbers of wildlife are found in riparian environments than in any other habitat type (Kattelman and Embury 1996; Thomas et al. 1979; Kauffman and Krueger 1984; Schulz and Leininger 1991). Wetland-riparian vegetation provides important sources of forage for domestic livestock (Clary and Webster 1990). Riparian vegetation is very important to the proper functioning of the adjacent stream, providing shading and adding chemical energy and nitrogen through the plant materials and insects that fall into the stream (Kattelman and Embury 1996; Meehan et. al. 1977; Cummins et al. 1989). Riparian vegetation protects streambanks from erosion and traps sediments and nutrients coming from upstream, thereby ensuring high water quality (Kattelman and Embury 1996). Healthy stands of riparian vegetation can ameliorate the adverse effects of upslope disturbances (Schlosser and Karr 1981).

Wetland-riparian vegetation varies both spatially and temporally. Spatial variation occurs in response to different physical and biological factors. Certain habitats are dominated by winter-deciduous tree species such as Fremont cottonwood (*Populus fremontii*), black cottonwood (*Populus trichocarpa*), Oregon ash (*Fraxinus latifolia*), red willow (*Salix laevigata*), hackberry (*Celtis reticulata*), white alder (*Alnus rhombifolia*), bigleaf maple (*Acer macrophyllum*), and California sycamore (*Platanus racemosa*). Several shrub species occur in

⁷ Much of this data derived from a Professional Judgment Assessment (PJA), where resource professionals were asked to use their own personal experience, skill, perspective, and familiarity with various wetland/riparian areas to answer functioning condition standard checklist questions.

these tree dominated habitats, or in other habitats the shrub species themselves are dominant: arroyo willow (*Salix lasiolepis*), sandbar willow (*S. sessilifolia*), narrowleaf willow (*S. exigua*), yellow willow (*S. lutea*), mulefat (*Baccharis salicifolia*), California wild rose (*Rosa californica*), interior rose (*Rosa woodsii* var. *ultramontana*), and California blackberry (*Rubus ursinus*). In other riparian areas and especially in meadows, herbaceous vegetation dominates. Several species of sedge (*Carex* spp.) may dominate separately or in combination. Of particular note are Nebraska sedge (*C. nebrascensis*), beaked sedge (*C. utriculata*), and shorthair sedge (*C. filifolia*), though many other sedge species may be present depending on geography and local factors. Rushes (*Juncus* spp.), spikerushes (*Eleocharis* spp.), and common three-square (*Scirpus pungens*) are also common in these habitats. Where the habitat is permanently or almost permanently flooded, cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) may occur.

Vegetation dynamics. Temporal variation in wetland-riparian vegetation occurs in response to disturbance. Natural disturbances due to flooding are common in riparian habitats. The degree of change to the vegetation in response to floods, depends upon the severity of an individual flood and the condition of the riparian vegetation at the time of the flood. Very severe floods can remove much of the vegetation. When this happens the vegetation progresses through a series of different successional stages until a relatively stable stage is reached. Manning and Padgett (1995) provide an excellent description of community types and successional pathways of riparian areas in the Great Basin.

Improper management of livestock grazing can have serious adverse effects on wetland-riparian vegetation. Livestock impacts riparian vegetation both through direct consumption of plant material and trampling. The latter affects vegetation by compacting soil, resulting in reduced infiltration, percolation, root growth, and plant production (Clary 1995; Bryant et al. 1972). Kattelman and Embury (1996) list the following interrelated impacts of overgrazing on wetland-riparian vegetation and wetland-riparian habitat: 1) reduction in vegetative cover; 2) changes in species composition; 3) introduction of exotic species; 4) reduction or elimination of regeneration; 5) compaction and cutting of meadow sod; 6) depletion or elimination of deeply rooted vegetation that strengthens banks; 7) loss of litter and soil organic matter; 8) erosion of stream banks, beds, and flood plains; 9) loss of overhanging streambanks; 10) destabilization of alluvial channels and transformation to wide shallow channels; 11) initiation of gullies and headcuts; 12) channel incision and consequent lowering of water tables; 13) desiccation of meadows; 14) increased water temperature during summer due to reduction of shade; 15) increased freezing in winter from reduction of insulation and snow trapping efficiency; 16) siltation of streams; 17) bacterial and nutrient pollution; and 18) decline of summer streamflow.

Probably all of the wetland-riparian areas on BLM lands have experienced overgrazing in the past. Livestock grazing was essentially unregulated on BLM lands until passage of the Taylor Grazing Act in 1934, and the fact that livestock congregate in riparian areas, particularly in the warm summer months, served to ensure the occurrence of many or all of the impacts listed above. Despite increased management attention to wetland-riparian areas and attempts to improve them, many of which have proven successful, serious problems remain. Improved management of wetland-riparian vegetation is one of the goals of the healthy rangelands initiative.

With respect to recovery, Kattelman and Embury (1996) state the following:

Riparian vegetation degraded by overgrazing generally recovers within a decade once grazing pressure is removed (e.g., Platts and Nelson 1985; Chaney et al. 1993; Nelson et al. 1994). As long as gullying has not lowered the water table, riparian and meadow plants will regrow in a few years if not consumed (Odion et al. 1990). However, there are many potential successional pathways (Menke et al. 1996). Channel morphology responds to the cessation of the disturbance much more slowly (Kondolf 1993). Decades to centuries may be required. Rates of recovery tend to be highly variable between locations and depend on the ability of the riparian vegetation to trap sediment and build streambanks.

Relatively rapid recovery of riparian areas can be expected if management is implemented soon enough; otherwise, complete recovery is unlikely in one human generation.

Although complete rest from livestock grazing is one management option for improving riparian areas, other grazing strategies can also result in riparian area improvement (Clary and Webster 1989; Elmore and Kauffman 1994). These include the use of riparian pastures, spring grazing, and attention to stubble height guidelines (with respect to the latter, see also Hall and Bryant 1995).

Weeds have become an important instrument of vegetation change in many wetland-riparian areas. The exotic Himalayan blackberry (*Rubus procerus*) and ailanthus have become established in many of the riparian areas found within the annual grassland vegetation type. Giant reed (*Arundo donax*) has become established in many riparian areas, particularly those in the Coast Ranges. Although not yet the problem it is in the Desert Province, tamarisk (*Tamarix* spp.) is expanding into many riparian areas in the California Floristic Province and the Great Basin. Perennial peppergrass (*Lepidium latifolium*) is also invading many riparian areas throughout the Great Basin. It is easily dispersed through flooding. Anne Halford (pers. comm.) witnessed clumps of perennial peppergrass floating down both the flood-swollen Truckee and Walker Rivers on January 1, 1997.

Managing livestock grazing to prevent overuse and to maintain or enhance the condition of riparian-wetland areas is often very challenging. On most allotments where riparian areas exist, the riparian areas, whether lentic or lotic, normally constitute a very small proportion of the allotment area and are often located in a fragmented pattern throughout each allotment. Although these areas constitute a very small amount of the overall forage available for livestock in each allotment, they are very attractive areas to livestock, because of their proximity to water, shade, and vegetation that remains succulent much longer than the adjacent upland vegetation. Consequently, livestock tend to congregate in these areas and can quickly overuse the riparian vegetation.

Total or seasonal exclusion from grazing usually requires either fencing, which is costly and requires almost continuous maintenance, or herding, which for cattle is very difficult. The herding of sheep is much more practical and has proven quite successful in protecting and enhancing riparian-wetland areas. However, as sheep grazing has declined over the past decades, the opportunities to apply these techniques are becoming limited. The feasibility of applying these techniques -- either fencing or herding -- on allotments containing many fragmented riparian-wetland areas is also questionable. Removing livestock from these areas

when predetermined grazing utilization thresholds have been met has been somewhat successful on some allotments, but there is still the problem of leaving the livestock on the remainder of the allotment for the rest of the grazing season.

The use of riparian-wetland areas by other ungulates, in conjunction with livestock, makes the problems all the more complex. Wild horses and burros, in particular, present a difficult management problem. These animals also find most riparian-wetland areas attractive and may overuse the vegetation even in the absence of livestock.

Yet another factor making riparian-wetland management difficult is the fact that on many allotments the majority of the riparian-wetland areas are privately owned and these areas are often intermingled with small areas of BLM lands. The ability to enhance and sustain healthy riparian-wetland areas on public lands requires extensive cooperation with all land owners and other interests. Opportunities for success in these areas may be limited.

3.4.3 Water Quality

Administration

Standards for water quality established by the State of California are identified in each of the nine (9) Water Quality Control Plans, commonly called "Basin Plans," that apply to each of the 9 Regional Water Quality Control Boards in the state. The regions applicable to this EIS include the North Coast Region (1), San Francisco Bay Region (2), Central Coast Region (3), Central Valley Region (5), and part of the Lahontan Region (6). See Map 5 for the location of the Regions. The standards for each region are identified as water quality objectives and non-degradation standards in these Basin Plans. The numerical standards are based upon U.S. EPA's handbook on water quality standards and identify general requirements based on land use activities and their relationship to the beneficial uses of the particular water bodies involved.⁸ (As a rule, the numerical standards are focused on point pollution activities, and the non-degradation standards are more applicable to non-point activities such as grazing.)

California's Water Resources Control Board publishes a California Water Quality Assessment, commonly called a 305(b) Report, which serves as a catalog of the State's water bodies and their quality condition. The latest publication was completed in 1996. This publication lists known impaired water bodies and known or suspected probable causes for point and non-point source pollution. The assessment is not exhaustive, nor is it site specific, but rather, it serves as an indicator of which water bodies are impaired, the impairment problem and the probable cause of the impairment.

The 1996 Water Quality Assessment (305(b)) Report listed 20 water bodies in California as being, or suspected of being, impaired by grazing, or that one of the sources of pollution is from rangelands within the watershed. The magnitude of impact or specific water quality problems related to livestock grazing on public rangelands with the watershed of the respective water bodies is not identified in this report. Some additional data is available at

⁸As defined within the Basin Plans, Water Quality Standards consist of both the designated "beneficial uses" and the water quality "objectives" needed to protect those beneficial uses. The standards are only one component of a Basin Plan. The entire Basin Plan, not just the standards, is the instrument that ensures water quality suitable for beneficial uses. Taken out of context of the Basin Plan, the water quality standards are often unachievable, and may raise unrealistic expectations.

the Regional Water Quality Control Board Offices, but site-specific information regarding non-point source pollution from livestock grazing on public lands has not been obtained.

In 1995 the State Water Resources Control Board approved a California Rangeland Water Quality Management Plan, which includes best management practices (BMPs) applicable to grazing activities on privately-owned rangeland throughout the state. Appendix 8 identifies the BMPs contained in the plan. The California State Director for BLM and the California State Water Resources Control Board have developed a Memorandum of Understanding regarding the management of non-point pollution sources on public lands administered by BLM. This agreement calls for the development of a water quality plan by BLM, part of which is to include best management practices for livestock grazing as well as other land uses. This plan is currently being drafted (the draft of the proposed livestock grazing section is in Appendix 10). When the plan is finalized and accepted by the State and U.S. EPA, the State will then enter into a Management Agency Agreement with BLM, formally recognizing BLM as a Designated Management Agency to manage non-point source water quality pollution activities under the Clean Water Act on public lands.

The State of Nevada's Division of Environmental Protection, Bureau of Water Quality Planning establishes and administers water quality standards for lands within Nevada. The water quality standards for the State are identified as Water Quality Regulations, last revised in November 1995. In addition the State Division of Environmental Protection and the Districts within the Nevada Division of Conservation have developed a Handbook of Best Management Practices (BMPs). This handbook identifies suggested BMPs to be used for land use activities, including livestock grazing. Appendix 9 identifies the BMPs suggested for livestock grazing in the Nevada handbook.

An agreement has not yet been developed between the Nevada Division Of Environmental Protection and the California State Director of BLM involving procedures for obtaining designated management status for those lands administered in Nevada by the California State Director.

Current conditions

Grazing activities, if excessive, may contribute sediment, nutrients and pathogens into the water supply that adversely impact water quality and impair beneficial uses. Soil erosion is generally considered the primary cause of lowered water quality on rangelands, and is caused by the removal of vegetative cover and trampling of surface soils both near and up-slope of water bodies. Nutrients leached from manure may be introduced into surface water in areas where livestock congregate for water, feed, salt, and shade. Localized contamination by pathogens in surface and ground water may result from livestock, particularly where congregated near surface water bodies. Fecal coliform levels are the primary indicator of this contamination. Water temperatures (both summer and winter) are also affected by removal of vegetative cover. In the summer, this temperature increase will result in a reduced dissolved oxygen level. In the winter, temperature decreases will result in more freezing of the channels. Additionally, excessive grazing has altered channel configuration, and lowered water tables.

In 1979, California BLM, under the requirements of Section 208 of the Clean Water Act, conducted a water quality problem assessment and published a report. Thirteen existing, suspected, or potential problems were identified that were associated with livestock grazing.

The primary concerns were with sedimentation, temperature, dissolved oxygen, pathogens, and mechanical habitat alteration. A query of the involved Field Offices in 1996 indicated that most non-source point water quality problems are now general in nature, and that some of the specific problems originally identified in the report have been resolved.

The State's Basin Plans have not identified specific non-compliance from BLM's grazing management activities and there have been no other identification of violations in complying with the Federal Clean Water Act or State Porter-Cologne Act resulting from BLM grazing management. The lack of known livestock associated water quality problems does not mean that they do not exist on Public Lands. Until recently the emphasis of most water quality studies has been on point sources of pollution, and there is, therefore, not yet a complete assessment of non-point source problems, particularly those related to livestock grazing on public lands. The concern by the public and resource managers that livestock grazing is an important non-point source of pollution has escalated in recent years; it is expected that more intensive assessments will be made to determine the locations and magnitude of any problems.

Currently there are several water bodies or portions of water bodies where livestock grazing activities on public rangelands are at least one of several suspected causes of non-point source pollution contributing towards impairment of the beneficial uses of the water. Some of these are identified in both the Basin Plans and the State-wide Assessment for California. As mentioned above, there is little information to make conclusions about the magnitude of the problem, about how much is due to the use of the public lands or stems from other ownerships, or about what specific remedies are needed. Most of the livestock-related impairment identified in these documents occurs along the eastern slope of the Sierra Nevada and in the Great Basin ecoregion.

There are also some areas within central California where public land livestock grazing activities are suspected to contribute to the acceleration of impairment, for example the introduction of selenium in some watersheds along the western portions of the San Joaquin Valley, and problems in the upper watershed areas of the Pit River. However, specifics regarding the cause or suggested remedies in these areas have yet to be determined.

There has been some concern expressed too, at least in California, that livestock watering areas, particularly impoundments and watering facilities, may not meet standards for municipal supply. By State resolution, this beneficial use is applied to all waters of the State unless specifically exempted. California's State Water Resources Control Board, however, through Resolution No. 88-63 has excepted impoundments (stock ponds) and troughs that have a sustained yield of less than 200 gallons per day from meeting numerical drinking water requirements. The State of Nevada has a similar exception. These exceptions should alleviate some of the concern related to complying with requirements, particularly for most livestock watering facilities. There may be some instances, however, where influences from livestock grazing activities within a watershed could threaten drinking water or recreational swimming qualities that are beneficial uses of a water body. To date, conformance with and enforcement of these standards for livestock grazing has not been a high concern and livestock grazing, being a non-point source of pollution, is not usually required to meet numerical drinking water standards unless there is a concern that a particular water body (impacted by grazing) will not meet pre-treatment standards for potable use.

Improvement methods

In some areas where livestock grazing was known to have contributed to impairment, remedies were put into place to eliminate or minimize the impairment. Some examples of remedies include the exclusion of concentrated livestock use at or near water bodies, either total exclusion through fencing or herding, or re-distribution of grazing activities. Measures have also been taken to reduce grazing levels in some of these areas, either through reducing the number of grazing animals, shortening the season, and/or changing the period of grazing to lessen the probability of impairment. Most current management measures designed to generally enhance riparian and wetland conditions also help improve water quality.

3.5 WILDLIFE

3.5.1 Wildlife Communities

Livestock grazing occurs in a variety of wildlife habitats on BLM lands in California that include many of the natural vegetation types occurring within the three Floristic Provinces of California: the California Floristic Province, the Great Basin Province, and the Desert Province (Hickman 1993; see Map 4). This EIS evaluates grazing management in the California and Great Basin Provinces, where livestock grazing in wildlife habitats on BLM lands predominately occurs on annual grasslands in the coastal, Great Valley, and Sierran and Cascade foothill regions, and in the sagebrush steppe communities of the eastern Sierra Nevada and intermountain regions.

Within the California Floristic and Great Basin provinces, livestock grazing on BLM lands occurs within 16 habitat types as described by Mayer and Laudenslayer (1988) for the California Wildlife Habitat Relationships System (CWHR). For analysis, these 16 habitats are combined into five vegetation and wildlife habitats: Annual grasslands, Pinyon-juniper, Chaparral, Sagebrush steppe, and Wetland-riparian. The acreage estimates of these vegetation types on BLM lands in California is shown in Table 3.5.1. Vegetative descriptions of these habitats are found in the previous vegetation section.

These habitat types, as described by Mayer and Laudenslayer (1988), serve as a habitat classification system to predict and evaluate wildlife use on a habitat basis. The relationships between 650 species of wildlife and their habitats have been described and used to develop the California Wildlife Habitat Relationships System. This system uses habitat models to rate the species' preference for a habitat and successional stage based on research, published literature, and expert opinion. A species preference for each habitat is rated as optimum, suitable, marginal, or not used for life sustaining activities, such as reproduction, foraging, and cover (Airola 1988). Based on this information, these habitat types support numerous wildlife species that would be expected to occur on BLM lands within the EIS area (Table 3.5.1(a)).

Table 3.5.1: Acres of CWHR Habitat Types on BLM Lands in California.
(from FRRAP, 1988)

Habitat Type	Acres (state-wide, in 1000s)
Annual Grasslands	
Annual Grasslands	350
Alkali Desert Scrub	586
Valley Foothill Hardwood (Oak Woodland)	411
Chaparral (Chamise-Redshank Chaparral, mixed Chaparral)	687
Sagebrush Steppe	
Sagebrush, Bitterbrush, Low Sage, Aspen	2,887
Pinyon-Juniper, and Juniper	766
Wetland-Riparian	
Valley-Foothill Riparian and Montane Riparian	2
Wet Meadow and Freshwater Emergent Wetland	68

**TABLE 3.5.1 (a): Number of Species expected to occur in each CWHR
Habitat Type ***

Habitat Type	Number of Amphibians	Number of Birds	Number of Mammals #	Number of Reptiles
Annual Grassland	10	101	43	23
Alkali Desert Scrub	4	87	36	20
Oak Woodlands	18	137	40	28
Coastal Scrub, Chamise- Redshank Chaparral, Mixed Chaparral	17	129	64	30
Sagebrush, Bitterbrush, Low Sage	3	84	55	24
Pinyon- Juniper, Juniper	3	135	52	30
Aspen	1	80	39	3

TABLE 3.5.1(a): Number of Species expected to occur in each CWHR Habitat Type *				
Habitat Type	Number of Amphibians	Number of Birds	Number of Mammals #	Number of Reptiles
Valley-Foothill Riparian, Montane Riparian, Wet Meadow	27	239	73	28

* These are regularly occurring species that are expected to occur if all habitat components (food, water, cover, and habitat patch size) and features (eg. cliffs, burrows, water, trees, cavities, snags, etc.) were present in the BLM habitats on public lands within the EIS area.

Excludes bats which may fly over and feed aerially.

The numbers of wildlife species that occur in Table 3.5.1(a) reflect the large geographical scale of the EIS area and the combination of CWHR habitats listed. Thus, the numbers of species that may occur in these habitats on a particular parcel of BLM land would be less than predicted by the CWHR. However, the table reflects the relative richness of wildlife species that may occur among the listed habitat types.

3.5.2 Big Game

BLM lands in California support populations of mule deer, pronghorn, tule and Rocky Mountain elk, and big horn sheep. The BLM's 1993 Public Land Statistics estimated that over 13,427,000 acres of BLM lands in California support big game animals. It is estimated that BLM lands provide habitat for 101,000 mule deer, 6,500 pronghorn, 1,000 elk and 4,200 big horn sheep in the state (including the California Desert District).

Mule Deer. The Columbian black-tailed deer (*Odocoileus hemionus columbianus*) and California mule deer (*Odocoileus hemionus californicus*) are the two subspecies that occur on BLM lands in the EIS area (Walmo 1981). Columbian mule deer occur in the coastal and northern California ranges, while the California mule deer occur in the Sierra Nevada and Tehachapi ranges over to the central coast.

Mule deer are most commonly associated with shrub and woodland habitats. In the coastal region of California, the preferred habitats include oak woodlands, chaparral, and riparian habitats, and the animals tend to be non-migratory. In the Great Basin, Sierra Nevada, and Cascade mountains, the preferred habitats include oak woodlands, forest communities, aspen, montane riparian, and meadows in the summer. Winter ranges occur in sagebrush and bitterbrush habitats on the east slopes and in chaparral, oak woodlands, riparian, and lower elevation hardwood conifer habitats on the west slopes when heavy snows force migrations to lower elevations.

Food and cover requirements vary greatly between the regions of California. Stomach analysis of coastal animals show that they feed on browse, including acorns, consistently throughout the year for about 48% of their diets. Forbs made up about 28% of the diet,

mostly consumed in the summer; grass and grasslike plants were eaten in the cooler months for about 24% of the diet (Walmo 1981). In the Great Basin region, forbs and grasses and grasslike plants contribute a significant portion of deer spring summer diets, while sagebrush, bitterbrush and service berry make up 95% percent of winter diets.

The relationship between mule deer and livestock grazing in California has been developing since the late 1700's when cattle and sheep were introduced with the development of the Spanish missions along the California coast (Burcham 1981). Cattle reached the north coast and Lassen County in the 1850's. Burcham (1981) reported cattle numbers of 253,599 head in 1850, increasing to 1,107,646 in 1950. For the same period, sheep numbers were 17,574 in 1850 and 2,056,663 in 1950, with a peak of over 4 million head in the 1880's. Livestock numbers peaked in the 1870's, but then drought conditions and hard winters reduced numbers in the 1880's and 1890's. The overgrazing of the California rangelands and mountains in the 1870's resulted in changes in shrub and forest vegetation that may have ultimately increased the numbers of deer in the state (CDFG 1991).

The immediate effect of the heavy grazing of deer habitats and unregulated hunting was a decline of mule deer numbers in the late nineteenth century. However, during the period of 1900 to 1960, deer numbers in California increased with estimates beginning in 1932 at just under 500,000 deer to over 2,000,000 in 1960. This increase is attributed to several factors: vegetation changes to more shrubby types as a result of overgrazing; more shrub habitats resulting from logging activities that opened the closed forest canopies; increases in fires in forest and chaparral communities that promoted sprouting of young shoots and more open habitats; and then regulated hunting and enforcement (CDFG 1991).

Since the 1960's there has been a decline in deer numbers not only in California, but across the western United States. Efforts have been made to relate this decline to factors such as habitat deterioration, predation, competition with livestock, habitat loss due to human development and hunting. However, none of these factors, individually or in combination, fully explains the population declines in all areas in which they occurred (CDFG 1991).

Since the 1970's, California's deer numbers have remained relatively stable at around 700,000 head. Increases in deer numbers in the state appears to be primarily influenced by the quantity and quality of habitat available (CDFG 1991).

Elk. Burcham (1981) noted that the early California settlers recorded elk as common to abundant in the coastal areas from Monterey Bay north to San Francisco, and throughout the Central Valley. They preferred the moister habitats in open country, occupying principally the margins of the marsh-grass community and areas that were not well drained. Herds of 1,000 to 2,000 animals were recorded, with early explorers estimating elk numbers above 500,000. The number of tule elk declined steeply in the mid-1800's due to market hunting and land use conversion to intensive agriculture. By the late 1860's, the elk of the central valley were reduced to one small herd in western Kern County (CDFG 1994a).

Changes in elk habitat through the conversion of native perennial grasslands to annual grasslands have been attributed to livestock grazing. This grassland conversion resulted in the loss of important forage plants used by elk in the summer and fall months (CDFG 1994a). However, it is unclear how this change may limit current population levels.

The north coast of California is currently populated by 3,500 head of Roosevelt elk (*Cervus elaphus roosevelti*) in the coastal regions of Del Norte, Humboldt, and Mendocino Counties. BLM lands that provide habitat for this species are not grazed by livestock.

Tule elk (*Cervus elaphus nannoides*) occur on BLM lands in San Luis Obispo, Lake, and Inyo Counties where they were transplanted from the remaining herd located at Tupman, Kern County in the San Joaquin Valley. Transplantation of tule elk has been a successful conservation program that has increased state populations from 500 animals in three herds in 1971, to over 2,700 animals in 22 herds distributed around the state in 1994 (CDFG 1994a). Approximately one-half of California's tule elk occur on local, State, and Federal public lands.

Tule elk inhabit chamise chaparral, mixed chaparral, and oak woodlands/savannah in the Cache Creek herd in Lake County; chamise chaparral, mixed chaparral, juniper-oak woodlands, oak savannah, and annual grasslands in the La Panza herd in San Luis Obispo County; and in alkali desert scrub and desert riparian habitats in the Owens Valley. Livestock grazing conflicts are considered negligible in these herds. Food habit studies suggest no direct competition between cattle and elk because the forage species are widespread and not in short supply (CDFG 1994a). The livestock industry has expressed concern regarding fence damage from some populations.

In Modoc County, three herds of elk are expanding and will probably include the use of BLM habitats in the near future. These populations, numbering about 200 animals in total, may occasionally inhabit BLM grazing allotments, in which adequate forage and cover will be a concern.

Pronghorn. Pronghorn (commonly called antelope) were originally distributed throughout the lower elevations of California from the outer borders of the marsh-grass community upward into the lower limits of the foothill woodland. They were noted by the early Californian anglo settlers and Native Americans as plentiful from San Diego through the coastal valleys, the Central Valley, and north to the vicinity of Klamath Lake. They were most abundant in the San Joaquin Valley, where they formed herds of up to two or three thousand animals (Burcham 1981) with densities reported to be greater than any area west of the Mississippi. The twenty years following the gold rush of 1848 saw great declines in pronghorn numbers due to market hunting, poaching, livestock competition, land use, agriculture, and other disturbances brought on by Anglo-American settlers (CDFG 1994b).

Since the 1940's, over 1,000 pronghorn antelope have been transplanted back to former historic ranges within California. Today, pronghorn remain abundant in the Modoc region of northeastern California, and they have been reintroduced into the coastal counties of San Luis Obispo, Monterey, and San Benito and into Mono County. Sizeable herds occur on BLM lands in nearly all of these areas, with over 66 percent of pronghorn range occurring on BLM and Forest Service public lands where livestock grazing is the primary land use (CDFG 1994b).

Increased agricultural production (alfalfa and grain crops), water development on public land, and more ecologically sound livestock grazing (now less destructive to wildlands in terms of over grazing and damage to vegetation) have likely been a great benefit to pronghorn antelope in California because of the increased availability of native forage, as well as high-quality forage crops grown for livestock on private lands (CDFG 1994b).

3.5.3 Upland Game

BLM lands in California and Nevada provide habitats for a variety of upland, small game and waterfowl species. The upland species that occur on grazed rangelands include several species of rabbits and hares, California quail, mountain quail, chukar, sage grouse, mourning doves, wild turkey, and ring-necked pheasant. The variety of habitats used by these species include all of the non-forested rangeland habitats in the EIS area, including grasslands, shrublands, and woodlands. Populations of these species have fluctuated with rainfall and other climatic patterns, with no consistent long term trend. Hunter harvest of quail, chuckar partridge, sage grouse, jack rabbits, and cottontail rabbits, used as a measure of upland game populations, have also fluctuated between 1987 and 1996 with 44% of the years showing increases in harvest and 56% of the years showing decreases in harvest between consecutive years. Recently, sage grouse populations have increased as riparian conditions have improved on BLM lands in Mono County (CDFG, pers. comm.). Livestock grazing commonly occurs within the habitats of these animals.

3.5.4 Riparian, Wetland, and Aquatic Communities

Riparian Communities. Riparian habitats represent the most important wildlife habitats on California rangelands. More than any other western habitat, riparian woodlands are centers of high diversity and abundance of neotropical migratory birds (Bock et al. 1993). Less than 1% of the western United States contains riparian vegetation, yet more species use them for breeding than any other habitat type in North America (Douglas et al. 1992). The presence or absence of many neotropical migrant species in riparian habitats is directly tied to the complexity and density of vegetation structure, especially in the shrub and herbaceous layers (Dopkin 1994). At least twice as many birds may be found breeding in riparian areas than in adjacent non-riparian areas (Stevens et al. 1977), and many species of birds breed exclusively in riparian areas and are not found at all in adjacent habitats (Hurst et al. 1980). For foraging, these areas provide a complex of foliage, bark and ground substrates. These habitats provide feeding sites during migration; and during the summer, the low elevation riparian habitats provide the only lush, insect rich forest habitat available.

Conservation of neotropical migratory land birds in the western United States depends greatly upon the protection and restoration of riparian woodlands.

Wetland Communities. California's wetland habitats support winter populations of 8 to 10 million ducks, geese, swans, and other birds -- about 60% of the entire Pacific Flyway population. Today's populations are estimated to be mere remnants of the hundreds of millions of waterfowl that once used millions of acres of wetlands in California. Loss of habitat due to agriculture and urban conversion has been the primary cause of populations declining (FRRAP 1988).

The location of BLM lands in California in the upland portions of landscapes limits the amount of wetland bird habitat on public lands. However, there are 129,257 acres of BLM lands (BLM 1989) supporting wetland species, and some special management areas managed by BLM make important contributions to conservation of wetland wildlife. Such areas include the Cosumnes River Preserve, BLM lands along the Sacramento River, and the Mattole River. In addition, there are numerous freshwater wetlands, alkali lakes, rivers and streams, flood control and domestic water reservoirs, stockwater reservoirs, and constructed wetlands that occur on BLM lands.

BLM wetlands have not reached their potential to support waterfowl and other wetland wildlife. Livestock grazing has contributed to this situation, but management plans and grazing management systems are being implemented to improve these habitats.

Fisheries. BLM lands in California include 3,500 miles of streams and 62,000 acres of lake and pond surface waters. There are 132 identified fish species in the state, of which 116 are native (67 endemic to California; BLM 1995). In northwest Nevada, there are eight native species and two endemic species. There are ten native species listed as threatened or endangered, and 35 listed as California species of special concern. Over 50 percent of the native species are either at risk of extinction or in decline. Although there are few pristine aquatic systems remaining in the state, there are several with intact native fish communities that are managed by BLM in California.

The condition of BLM aquatic habitats has not been rigorously inventoried and classified, but has been evaluated through the process of proper functioning condition assessments. In 1995, BLM determined that, within the EIS area, 319 miles (28%) of stream habitat were in "proper functioning condition" to provide the habitat necessary for fish production, 807 miles (69%) were "functional at risk" due to degradation, and 37 miles (3%) were "non functional" and do not provide the characteristics necessary for fish production and survival (see Table 3.4.1(a) on page 40). This analysis did not, however, determine whether livestock grazing or other factors were responsible for areas not being in proper functioning condition. The BLM is working to complete proper functioning condition determinations for all riparian habitats with fisheries by the end of 1997. Livestock grazing is estimated to occur on 33 percent of the BLM managed stream miles in the state.

3.6 SPECIAL STATUS SPECIES

Occurrence of special status species on BLM grazing allotments within the project area varies significantly by species. In some cases, the species have been recorded within Field Office jurisdictional boundaries, but they are not known to occur on any grazing allotments. In other cases, the species are known to make year-round use of the grazed habitats. Other degrees of overlap and use of the grazing allotments include seasonal use, selective use of a specific habitat component (e.g. riparian), and occasional or incidental use by wandering individuals.

Appendix 11 shows the 159 special status plant species with recorded occurrences on BLM lands within the project area. Thirteen of these species are federally listed (11 endangered, 3 threatened) and 23 are state-listed (15 endangered, 3 threatened, and 9 rare).

Appendix 12 shows the 43 special status animal species that are known or suspected to occur on BLM lands within the project area. Thirty-one of these species are federally listed (20 endangered, 11 threatened) and 23 are state-listed (19 endangered, 4 threatened).

Both appendices show the species, the status, the Field Office jurisdiction within which it occurs, and the effects of grazing upon the species. Where there is only minor overlap between a species occurrence and a BLM grazing allotment, that is also noted in the appendix.

3.7 WILD HORSES and BURROS

With the passage of the Wild Horse and Burro Act (Public Law 92-195) in 1971, Congress declared that wild horses and burros (*Equus* spp.) are to be considered an integral part of the natural system of the public lands. Among other things, the Act requires BLM to maintain a current inventory of wild and free-roaming horses and burros on public lands and to determine their appropriate management levels (AMLs). The appropriate management level of a given area is one that will preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area.

When BLM determines that an overpopulation of wild horses and burros exists on a given area and that action is necessary to remove excess animals, it must remove the excess animals to achieve appropriate management levels. Generally, BLM monitors environmental indicators and considers this information along with information that it has gathered about impacts caused by other use(s) (principally livestock grazing) and with available information concerning wild horse and burro demographics. These data are periodically analyzed to determine what constitutes an appropriate management level for a given area for a given period. Following this determination, BLM periodically gathers and removes sufficient animals to approximate the current AML for that herd management area.

To administer the Act on public lands,⁹ BLM California has designated 14 Herd Management Areas within the EIS analysis area. Map 6 depicts their general location. Each Herd Management Area is managed "on-the-ground" under the auspices of a Herd Management Area Plan, except for the Montgomery Wild Horse Territory which is managed through a Coordinated Resource Plan under the lead of the Inyo National Forest. Information about these management areas pertinent to this EIS is shown in Table 3.7, below.

TABLE 3.7: Herd Management Area (HMA) Information for HMA's in EIS Analysis Area					
HMA NAME	SIZE (Acres BLM, and Other)	GENERAL LOCATION	AMLs ^a (Number of Animals)	LAST CENSUS (Federal Fiscal Year)	ESTIMATED CURRENT POPULATION ^b
Fort Sage	14,695	NE California	38* horses	1994	15 horses
Twin Peaks	797,927	NE California and NW Nevada	725* horses 132* burros	1994	1071 horses 123 burros 15 mules
Ravendale	27,560	NE California	15* horses	1996	47 horses
Red Rock Lakes	16,895	NE California	21* horses	1993	26 horses

⁹ The Wild Horse and Burro Act also applies to lands in the National Forest system.

TABLE 3.7: Herd Management Area (HMA) Information for HMA's in EIS Analysis Area					
Devil's Garden ^c	236,000	NE California	305* horses	1996	280 horses
Coppersmith	70,760	NE California and NW Nevada	63 horses	1996	91 horses
Buckhorn	65,640	NE California and NW Nevada	72 horses	1996	81 horses
Fox Hog	119,280	NW Nevada	63* horses	1996	314 horses
High Rock	115,100	NW Nevada	85* horses	1994	168 horses
Wall Canyon	49,277	NW Nevada	20 horses	1994	35 horses
Nut Mountain	40,680	NW Nevada	43 horses	1994	52 horses
Bitner	50,660	NW Nevada	20 horses	1994	27 horses
Massacre Lakes	40,730	NW Nevada	15* horses	1989	41 horses
Carter Reservoir	23,200	NW Nevada and NE California	25* horses	1989	55 horses
Montgomery Pass Wild Horse Territory ^d	207,921	Central East California and Central West Nevada	184 horses	1996 ^e	149 horses
15 Herds	1,876,325 Acres		1694 horses 132 burros		2452 horses 123 burros 15 mules

Footnotes to Table 3.7

- a. With the exception of the Montgomery Pass Wild Horse Territory (see footnotes d and e), the appropriate management levels listed in this column are the mid-points of population ranges that the herds are managed within, for each Herd Management Area, in accordance with a method known as "Structured Herd Management." Populations designated with an asterisk were established in the respective land use plan and based on the forage allocations contained in said plans. The other AML's were designated following a determination based on analysis of monitoring information that occurred subsequent to the approval of the land use plan.
- b. Except for those HMA's that were censused in 1996, current population estimates are based upon a formula that estimates a herd's population increase since the last census. This formula accounts for the following factors: recruitment rates expected in the years after a gather (accounting for an increased conception rate in the year following the removal, carrying through term, and foal survival); age structure of the herd following a removal; and mortality. Generally, over a period of 4 years, this rate of increase averages 17 percent. The Montgomery Pass Wild Horse Territory demographics have been and are being studied by Dr. John Turner (see footnote e).

- c. This Herd Management area occurs principally on the Modoc National Forest (227,500 acres MNF and private lands occurring in the MNF, and 8500 acres BLM and private lands occurring in the Alturas Field Office jurisdiction, BLM) and is managed in cooperation with the Modoc National Forest.
- d. The Montgomery Pass Wild Horse Territory is managed through a Coordinated Resource Plan under the lead of the Inyo National Forest. It includes lands administered by their Mono Lake Ranger District, the Toiyabe National Forest - Bridgeport Ranger District, the Carson City District BLM (Nevada), the Bishop Field Office BLM (California), and State lands (California) and private lands.
- e. This figure is based on a fall, 1996, inventory by Dr. John Turner. The Montgomery Pass Wild Horse Herd has not been gathered since 1984. It is the only naturally regulated population of wild horses in the United States. The population trend of this herd has been studied since 1986 and is down. Spring and summer mountain lion predation is a significant factor affecting the demographics of this herd. (Dr. John Turner, Professor of Physiology, Medical College of Ohio, personal communication, November 4, 1996).

All of the wild horses and burros occur in remote areas of the sagebrush steppe (see Section 3.3.2 for a description). A review of the pertinent Herd Management Area plans indicates that land condition in the wild horse and burro HMAs generally is fair (based upon NRCS's poor, fair, good, excellent scale, as explained in Section 3.3.3, Upland Conditions and Trends), with some having relatively more poor condition land, and others having more good condition land. All support a host of wildlife species typical to the Great Basin, including deer and pronghorn and numerous non-game species; however, "top-of-the-food-chain" predators such as mountain lions, that used to occur in greater abundance prior to settlement by the pioneers in the 1800's, are scarce. One herd management area supports bighorn sheep. Most have riparian areas, some to a greater extent than others. All support permitted livestock grazing - principally cattle with some sheep use. Most occur on lands in Wilderness Study Area status. Some have significant cultural resources.

With the exception of the Montgomery Wild Horse Territory, which has a naturally regulated population, all of the populations are managed under the principals of Structured Herd Management. Under this technique, BLM periodically gathers the entire population of a herd (or, as close to the entire population as practicable) and specific animals from the gathered herds are placed back out on their range while the remainder are put into the BLM's wild horse and burro adoption program. In this way, the age structure, sex-ratio, and animal characteristics (color and height) of each herd are purposefully managed by BLM. The effects of this technique on the social interactions in and among the herds is not known; however, it does not seem to significantly affect the viability of the populations.

Livestock grazing occurs within all Herd Management Areas. There is considerable overlap of forage and habitat space between wild horses and burros and livestock. This overlap results from the similarities in the forage preferences between these ungulates, mainly for grasses and forbs. Usually the overlap is greater between cattle and wild horses and burros than with sheep, but there are exceptions depending upon the time of year used by livestock and what is available on the rangelands. Much of the time, these animals also use the same locations for watering and shelter or shade. However, wild horses tend not to use canyon bottoms or areas where their ability to spot predators might be limited. They usually limit their use of these areas to watering or for access to other more open areas. Due to the variability in terrain, vegetative communities, and other features, as well as the population and distribution of wild horses and burros, the areas and magnitude of overlap is usually quite varied and complex within the Herd Management Areas. In most Herd Management Areas, the overlap does not necessarily exist over the entire unit, but tends to be concentrated in specific areas. Of particular concern because of this overlap is the amount of degradation of riparian-wetland areas that is attributable to wild horses and burros. In some areas, livestock are removed from riparian areas, and wild horses and burros then move in, thus giving the areas no rest.

In order to determine the size of, and manage for, viable wild horse and burro populations in these Herd Management Areas, consideration needs to be given to the prudent allocation of forage available for both wild horses and burros, and livestock. Policies direct that the allocations are to be made based on the monitoring of forage use between the different animal species, conditions of the resources, requirements for sustaining viable wild horse and burro populations, and the proportions to be made or other previous commitments made in allocating forage between all of the competing ungulates that use the rangelands, including wildlife species such as deer, elk, and pronghorn. Although these allocations have been made in the past, the methods used and rationale for the allocations are often questioned by advocates for the different competing species, be they wild horses and burros, livestock, and/or wildlife.

Determinations of how much of the forage is consumed and needed by each type of animal and how much should be allocated among the competing types of animals, continues to be highly controversial and continually challenged. There needs to be improvement in developing better scientific methods for determining the forage use and needs of the animals. There needs to be agreement and clear understanding (usually reflected in land use plans) of what the appropriate wild horse and burro population levels are for any given Herd Management Area. And there needs to be a clear understanding of what proportion of the forage is to be allocated to livestock and other competing animal populations.

Range improvement facilities developed in the past, sometimes watering facilities, but particularly fences for controlling livestock, have not always been designed to consider the needs of wild horses and burros. Often these facilities interfere with the natural habits of the wild horses and burros, causing disruptions in movement across their range, population levels and dynamics. Likewise, wild horses and burros often cause damage to these facilities, requiring continuous maintenance and repair.

3.8 RECREATION

The public lands of California and Northwestern Nevada, with their tremendous variety of features and their location within a few hours of large population centers and major airports, offer a wide variety of recreational opportunities. Recreational use of the lands managed by BLM continues to grow at a phenomenal rate, as the population of California grows and the area grows as a destination for in-state, out-of-state, and foreign visitors. The 5.1 million acres of public lands covered by this study contain 13 recreation rivers, 32 developed campgrounds, dozens of trails, and untold opportunities for semi-primitive outings in open, unspoiled country.

Examples of recreational opportunities in the northwest part of the state include beaches and rugged mountains, offering equestrian, backpacking, and OHV opportunities. People watch wildlife such as sea lions and whales off-shore and Roosevelt elk in the meadows. Inland are OHV opportunities at South Cow Mountain, nature trails, and the Cache Creek Recreation Lands. Wildflowers are abundant, or a person can try to identify any of the 200-plus varieties of mushrooms that grow at Mad River Slough. The Upper Klamath, Trinity and Eel Rivers are home to salmon and steelhead, while the fierce rapids and calmer waters delight rafters.

Northern California and northwestern Nevada have thousands of sagebrush-covered acres with wild horses and pronghorn, and excellent hunting for big game and waterfowl. The Bizz

Johnson trail is used by hikers and bikers in the summer and by skiers in the winter. Water sports and fishing are enjoyed at Eagle Lake. Prospecting for jasper and petrified wood in High Rock Canyon or exploring the Lassen-Applegate emigrant trail are also popular. The Barrel Springs and Buckhorn Canyon Back Country Byways provide routes for those who really want to explore the area.

Central California and the Eastern Sierra similarly have a myriad of recreational opportunities. Sightseers tour the Alabama Hills, where countless film classics were made. There are volcanic cinder cones to explore, miles of streams to fish, and trails to hike, mountain bike, or ride a horse or OHV. The Pacific Crest Trail wanders across BLM lands, as well as National Forests and National Parks. The Carrizo Plain, the state's largest nature preserve, and part of the Pacific Flyway, is a bird-watchers' paradise. The canyons of the Tuolumne, Merced, Yuba, and American Rivers attract rafters, kayakers, fishermen, and others, as well as people still looking for gold in the heart of the Mother Lode country.

In Fiscal Year 96 (October 1, 1995 to September 30, 1996), there were about 3.75 million visits to these public lands (ranging from an hour to a couple of weeks), totalling more than 3.04 million visitor days (12 hours = 1 visitor day), and contributing an estimated \$200 million to the local economies. Most of the users of the public lands -- from fishermen to sightseers, OHV users to bird watchers -- depend upon a properly functioning ecosystem to provide them with the recreational opportunity they desire.

Grazing provides both positive and negative impacts to recreational use of the public lands. Some negative impacts are degradation of the environment in some areas, especially impacts to riparian areas and water quality, and the visual intrusion of seeing livestock in primitive areas where people expect a natural environment. Positive impacts are the visual impacts for those (especially foreign tourists) who see cattle as a bit of the "wild west." There are also a growing number of recreationists who come to partake of the "city slicker" type of cattle and horse drives increasingly being offered on public lands.

There are also impacts to the health of the land from recreational use. These have not been systematically inventoried and totalled, but include in some locations: poorly constructed or designed roads, OHV routes, and equestrian and hiking trails that result in excessive erosion, or go through sensitive wet meadows or riparian areas; trampling of riparian vegetation by campers and fishermen; and intentional vandalism of cultural sites, range improvements, signs, etc.

3.9 WILDERNESS

Within the EIS area, BLM currently manages eleven wilderness areas totaling 162,500 acres. Seven of these, totaling over 110,000 acres, are grazed. BLM also manages 77 Wilderness Study Areas (WSAs) totaling approximately 1,197,000 acres. Sixty-two (62) of these, totaling a bit over 1,175,000 acres, are currently grazed. The wilderness areas or WSAs which are either grazed or permitted for livestock use are found in Appendix 13.

The authority for managing wilderness areas is found in the 1964 Wilderness Act, the Federal Land Policy and Management Act of 1976 (FLPMA), and the Act establishing the specific area as wilderness. These Acts generally direct BLM to manage wilderness areas so their natural condition is preserved and the human influences in the area are substantially unnoticeable.

As defined in the Wilderness Act, these areas must be at least 5,000 acres or of sufficient management size, appear to be affected primarily by the forces of nature, and have outstanding opportunities for solitude or a primitive and unconfined type of recreation. The overall goal for the wilderness management program is to ensure that each of these wilderness values are maintained or enhanced. To secure these values, the Wilderness Act prohibits certain uses within wilderness areas. Except as specifically provided for in the Act and subject to existing private rights, BLM cannot authorize commercial uses or the building of permanent roads in wilderness areas. Furthermore, except as necessary to meet the minimum requirements for the administration of the area for the purpose of the Wilderness Act (as defined in Section 2(a)), the Act prohibits temporary roads, use of motorized vehicles, motorized equipment or motor boats, landing of aircraft, mechanical transport, and structures or installations within any wilderness area.

The Wilderness Act provides a special provision for grazing use. Section 4(c)(4)(2) states that the grazing of livestock where established prior to the effective date of an area's wilderness designation shall be permitted to continue subject to reasonable regulations (a more detailed explanation of this provision is found in the Congressional guidelines regarding "Grazing in National Forest Wilderness Areas" published in House Report 96-1126, dated June 24, 1980). Grazing in BLM wilderness is currently managed under 43 CFR 4100 and 43 CFR 8560. Existing grazing may include not only the utilization of forage, but also the use and maintenance of the livestock management developments and facilities associated with the grazing activity at the time of the designation and which are in compliance with an approved Allotment Management Plan. For specific grazing actions in wilderness, the BLM 8560 manual titled "Management of Designated Wilderness Areas" provides additional guidance.

The authority for managing Wilderness Study Areas (WSAs) is primarily outlined in Sections 202 and 603 of FLPMA. This Act required BLM to either inventory its public lands or determine through future land use plans which areas have wilderness values as defined in the 1964 Wilderness Act (i.e., 5,000 acres or of sufficient management size, naturalness, outstanding opportunities for solitude or a primitive and unconfined form of recreation). If areas had these values, they were designated as WSAs.

Managing WSAs is different than managing a congressionally designated wilderness. As with wilderness areas, the preservation of a WSA's wilderness values is always paramount and is the primary consideration for evaluating any proposed action or use that may impact those values. However, BLM's management goal for WSAs (in contrast to wilderness areas) is to ensure actions affecting WSAs do not impair their suitability for preservation as wilderness (commonly called the "non-impairment mandate"). Subject to exceptions, certain non-impairment criteria must be met before any action is approved in a WSA. For example, proposed facilities or uses must be temporary (i.e., the use does not create a surface disturbance and can be easily terminated), and they cannot constrain Congress's prerogative regarding the area's suitability for preservation as wilderness. As they relate to grazing, certain exceptions to this standard could apply. These could include uses or facilities which clearly protect or enhance wilderness values (e.g., the removal of man-made facilities) or actions which are considered grandfathered (e.g., grazing management as was occurring on or before the passage of FLPMA). However, even these exceptions must still be managed to prevent unnecessary or undue degradation of the public resources. BLM handbook H-8550-1 titled "Interim Management Policy for Lands under Wilderness Review" provides additional guidance for managing grazing uses within WSAs.

3.10 CULTURAL RESOURCES

Cultural resources are divided into two categories, cultural properties and traditional lifeway values. These are the material items and places, and the beliefs and behaviors, that define the culture and cultural history of a group of people. For a brief cultural history (prehistoric and historic) of the western United States, see Chapter 3 of the Draft Rangeland Reform '94 EIS (BLM, 1994).

3.10.1 Cultural Properties

Cultural properties are physical remains of human cultures. They can be of prehistoric or historic origin. Typical examples are historic districts, sites, buildings and artifacts that are important in past and present human events. Cultural properties are managed primarily through the Section 106 (National Historic Preservation Act) compliance process. Before authorizing surface disturbance, BLM must identify cultural properties eligible for inclusion on the National Register of Historic Places and consider the effects of the proposed undertaking through the consultation process in Section 106.

Being the tangible remains of human cultures, cultural properties are subject to physical impacts from livestock grazing. In riparian zones, around springs and watering tanks, along livestock trails and fences, and in confined areas such as holding pens, livestock trampling can significantly impact and potentially destroy shallow archeological sites. The impact on riparian zones is particularly significant since cultural resources site densities tend to be higher in these areas. Not only do livestock accelerate bank erosion along streams where cultural deposits are often buried, but the depletion of ground cover through trampling and overgrazing hastens the erosion of cultural properties by wind and rainfall. Additionally, cattle rubbing against objects can destroy historic structures and rock art (BLM, 1994).

Cultural properties may also be damaged by earthmoving equipment such as bulldozers, backhoes, drills, and hand tools, or when roads, trails, and other access routes are developed, maintained, or improved to facilitate rangeland operations. The severity of effects varies with the intensity of the proposed activities. Additionally, cultural properties near rangeland activities are vulnerable to increased vandalism, theft, and impacts from vehicle use (BLM, 1994).

3.10.2 Traditional Lifeway Values

A traditional lifeway value is important for maintaining a specific group's traditional system of religious belief, cultural practice, or social interaction. A group's shared traditional lifeway values are abstract, nonmaterial, ascribed ideas that cannot be discovered except through discussion with members of the group. Lifeway values may or may not be closely associated with definite locations.

Native Americans

Native Americans use their local environments to gather native plants, animals, and minerals for use in religious ceremonies, rites of passage, folk medicine, subsistence, and crafts. In Native American religious practice, any environment can contain specific places that are significant for spiritual purposes. Those sacred places embodying spiritual values are often associated with indigenous rock art, rock cairns and effigy figures, spirit trails and spirit gates,

caves, mountain peaks, and springs or lakes. Contemporary use areas are associated with traditional plant and mineral collection locales, vision quest sites, shrines, and traditional trails.

Federal concerns with Native American traditional lifeway values primarily respond to the American Indian Religious Freedom Act of 1978 (see Appendix 3 for a more complete list of various cultural resource laws). This act requires federal agencies to evaluate their policies and procedures, with the aim of protecting the religious freedom of Native Americans. But in compliance with several laws and executive orders, as well as a sincere desire to ensure that Native Americans can continue to practice their traditional lifeways, it is BLM policy to consult with tribal groups whenever a proposed activity on BLM land might adversely affect that group's ability to continue those traditional lifeways.

As Europeans settled California and the livestock industry has developed over the past 200 years, Native American traditional lifeway values have been considerably altered. Historically, ranching (starting with the Spanish missions) has directly conflicted with Native American traditional lifeway values; in many cases, totally destroying people's ability to practice those lifeways. Even where the traditional lifeways are being continued, grazing on public lands can interfere with those lifeways. Some examples are:

Destruction of traditionally used resources (through vegetative treatments, overgrazing).

Denial of access to traditionally used plants during the relatively short periods when they may be available or denial of access to enhance the habitat (traditionally, many areas were burned or otherwise manipulated by Native Americans to enhance propagation of certain species, etc.).

Sacred sites and burials may be damaged or desecrated by livestock.

Some religious practices require solitude and isolation.

Ranching Communities

Participants in traditional ranching life are carrying forward a significant part of the world's image of America and America's image of itself. Western ranching communities have traditional activities, social behaviors, and values that are part of the Nation's historic, cultural, and natural heritage. An integral part of this tradition are the traditional cultural properties that have developed over the years, including the associated landscape with its developed springs, wells, and watering tanks, fencelines, wild horse traps, corrals, ranch houses, sheep herding camps, shearing pens, loading chutes, grange halls and community centers, and one-room school houses.

This traditional western ranching culture can be traced to the 1600s in California. It involves the production of cattle and sheep, mainly through grazing and haying of forage. The identity of many small towns and communities in northern, central and eastern California continues to be associated with this tradition, and its activities, behaviors and values.

However, due to the economics of the livestock industry, many small ranching communities, or families within these small communities, are struggling to maintain their traditional lifestyle. More and more of these ranchers are working jobs off the ranch to secure greater financial

stability, and support their families. The number of ranchers whose main occupation is not ranching has increased substantially over the past 20 years. Part-time ranching has become a growing part of U.S. agriculture. This rural economic diversification has enabled many ranching families to remain in ranching part time and maintain their traditional ranching lifestyle.

But at the same time, as demographics change, and more people flee the big cities to live and work in these small communities, they are bringing a different culture with different value systems into these communities, thereby introducing another element that threatens the traditional lifestyles and values of these communities.

3.11 ECONOMIC CONDITIONS

Changes in the BLM grazing program have the potential to economically affect livestock operators, local governments, and communities, as well as the expenditures of the BLM rangeland management program. The economic impact of each Standard and Guideline alternative will be analyzed for each of the entities listed above.

The economic impact variables that will be analyzed in this document are: livestock revenues and expenses and ranch permit value, state and county income, employment, government transfer payments, and California possessory interest taxes. These variables will be examined for the EIS study area and principal grazing counties. The following economic affected environment section for the Final EIS has not been changed from the draft version of the EIS.

3.11.1 The Western United States

3.11.1.1 The Western Livestock Industry

While livestock operators with permits to graze on federal land are economically important regionally and to local communities, they are only a small part of the national beef and lamb industry. There are an estimated 22,350 separate livestock operators who hold permits to graze on federal rangelands (Fowler 1993). These operators comprise 3.4% of all livestock operations in the country. Eighty-two percent of the permits are for cattle grazing and 18 percent for sheep. These and the following Western Region statistics are drawn from the 1994 Rangeland Reform EIS (RR 94; BLM 1994).

In the 11 western states, where federal rangeland is concentrated, permittees and lessees make up 22 percent of total beef producers and 19 percent of sheep producers. The permits provide about 25 percent of all forage consumed by beef cattle in a year. BLM administered land makes up about 5 percent of the overall annual feed requirements for sheep operations.

The importance of federal rangelands to livestock production can also be measured by rancher dependency on federal forage. This dependency is measured as a percentage of how much of the annual forage required is supplied from federal rangeland. The average dependency varies greatly by state due to such factors as the amount of federal land and weather. Average dependency of permittees on federal forage is highest in Arizona where there is year-round grazing (60 percent), and lowest in Montana where there is less federal land and weather is a large factor prohibiting year-round grazing (11 percent). The cattle

forage dependency percentages were 15 percent for California and 36 percent in Nevada. The comparable percentages for sheep were 24 and 43 percent.

3.11.1.2 Western Employment and Income -- Regional Trends

Changes in the livestock industry are a part of the larger dynamics in Western agriculture. Employment in the agriculture industry grew from 1.28 million jobs in 1982 to 1.48 million in 1990. Even though agricultural employment is up, it is becoming less significant in the regional economy. In 1982, agricultural employment accounted for 5.8 percent of total employment. By 1990, this proportion had fallen to 4.5 percent of all Western employment.

The 16 western and Great Plains states had a \$1 trillion dollar economy in 1982 (1993 dollars). This figure increased to about \$1.35 trillion in 1990. All sectors except agriculture showed positive growth in income over the period.

3.11.1.3 Western Ranch Income and Operations

The western livestock industry and federal forage are economically important, regionally and locally. Federal rangelands are essential to the economic vitality of many family farms and ranches. In some western communities, ranching is the main economic activity.

The 1990 Farm Costs and Returns Survey of the U.S. Department of Agriculture, Economic Research Service, included a random sample of U.S. beef cow-calf operations. The study analyzed the ranching economics of permittees compared to livestock operations that did not hold grazing permits on federal land, in eleven western states, and found that there were very significant differences. As shown in the following table, operators with federal grazing permits average more than twice the herd size of non-permittees (221 to 93).

Table 3.11.1.3: Western United States Beef/Lamb Livestock Operation Ranch and Herd Size, Permittees and Non-Permittees in 1990		
	Permittees	Non-Permittees
Number of Ranches	6678	49,658
Average Herd Size (Number of Cows)	221	93
Percent of Operations with:		
Fewer than 100 Cows	33.9 %	61.6 %
100 to 499 Cows	56.9 %	35.1 %
500 or more Cows	9.2 %	3.3 %

Source: 1990 Farm Costs and Returns Survey cited in Rangeland Reform 94 EIS.

This survey also found that there were significant differences in ranching economics. The key difference is that permittee operation expenses were lower than livestock operators without federal permits. Permittees' expenses were \$146 per cow less. Three factors account for

most of the difference: 1) non-permittees bought more cattle, which is more expensive than raising your own (\$43 per cow difference); 2) non-permittees did not have as much land and therefore had to buy more feed, which is also more expensive (\$57/cow difference; and, 3) the non-permittee capital expenditure per cow (machinery, equipment, etc.) was much higher (\$40 per cow difference) because they typically have much smaller herd sizes (average 93 animals to 221 for permittees) and the economy of scale factor applies.

While expenses were lower, per-cow receipts were also lower for permittees compared to livestock operators who did not use federal land for grazing. Permittee receipts were \$63 per cow less. One explanation of the receipt difference is that cattle raised on federal land have lower weights when they are sold. Weight gains on federal lands drop significantly as the forage dries out and loses nutritional value. In the Intermountain West, while high elevation rangeland will retain higher nutritional value for much of the grazing season, lower elevation rangeland dries out significantly and cattle can actually lose weight in late summer and fall.

The market demand for beef cattle forage depends on cattle prices, which fluctuate with an approximate 10-year cycle. This is illustrated in Nevada calf prices in the last ten years (NV Agricultural Statistics Service). 1995 prices were similar to 1985 with monthly highs and lows during the year from 51.8 to 77.2 cents per pound. But in 1991 and 1993 calf prices never went below 86.3 cents per pound and in both years calves brought over one dollar a pound (high of \$1.089) in some months. An 800 pound calf sold in April of 1991 brought in \$871.20 for the rancher. That same type calf in September of 1995 made \$414, a difference of \$457.20, with perhaps no difference in what it cost to raise that calf.

The 1990 USDA Farm Costs and Returns Survey (FCRS) studied cost and return data for cow-calf operations (Shapouri et al. 1993). Based on a representative random sample of all Western livestock operations, the study found that the average permittee operation with 221 cows had cash receipts of \$95,502. Total cash expenses were \$75,742, and capital expenditures were \$18,446, which yields a net cash return of \$1,314. As seen in the following table, cash returns (revenues minus cash costs) are positive for operators at all benchmark levels of herd size and dependency on public forage.

Table 3.10.1.3(a): Cow-Calf Costs and Returns for Western Permitted Ranches				
	Permit Dependency on Federal Forage			
	Low (10.9%)	Average (36%)	Medium (43.8%)	High (85%)
Herd Size	308	221	217	93
Ranch Revenue	\$153,313	\$95,502	\$94,178	\$37,705
Revenue per cow	\$ 498	\$ 431	\$ 434	\$ 405
Ranch Cash Costs	\$108,616	\$75,742	\$82,718	\$29,333
Returns after Cash Costs	\$44,697	\$19,760	\$11,460	\$8,372
Returns per Cow	\$145	\$86	\$53	\$90

Source: 1990 Farm Costs and Returns Survey cited in Rangeland Reform 94 EIS.

3.11.1.4 Permit Value in the Western United States

A value associated with a federal grazing permit is considered in the purchase and sale of ranch property. This economic value is different from a recognition of permit value by federal land management agencies. The Taylor Grazing Act, the Federal Land Policy and Management Act, grazing regulations and case law, have consistently held that issuance of a grazing permit does not create any right or title to the permit owner.

Despite this, banks (including the Federal Home Loan Bank) and the Internal Revenue Service consider the value of permits when property is transferred. A 1993 Forest Service - BLM report found average permit values range from \$36 per AUM in Wyoming to \$89 per AUM in New Mexico.

3.11.1.5 Government Transfer Payments

Payments in Lieu of Taxes (PILT)

Under the PILT Act, Congress makes payments to local units of government to compensate for the lack of local property tax revenue from federal land. This payment supplements the other federal revenue sharing payments -- such as grazing fee receipts -- that local governments receive. PILT payments are subject to a payment ceiling based on a county's population.

In 1992, Payment in lieu of Taxes for BLM and U.S. Forest Service land totaled \$79,933,891.

Grazing Fee Receipt Distributions

Grazing fee receipts are distributed according to two different legislative requirements. In each case, fifty percent is returned to the BLM District where the fees were paid for projects under the BLM Range Improvement Fund. The states receive a varying percentage (12.5 to 50%) for distribution to the county of origin. In 1991, BLM grazing fee receipts distributed \$8,685,000 to the Range Betterment Fund and \$3,216,000 to states and counties.

3.11.1.6 Western United States Federal Rangeland Management Revenues and Costs

The costs of managing public rangeland are shown in Table 3.10.1.6. Livestock grazing expenses refers to the direct grazing program costs for such things as administering permits, designing grazing systems, livestock structures (e.g., fences) and completing NEPA analysis and documentation. The non-grazing expenses refers to work related to rangeland conditions (e.g., vegetation, water) and includes costs associated with monitoring, assessments and improvement. In 1993, grazing fee receipts collected by BLM and the Forest Service totaled \$28.1 million (RR 94, Chapter 3, page 72). BLM and Forest Service Rangeland Management Program Costs for 1993 totaled \$94,036,000 (RR 94, Chapter 3, page 10). The total rangeland program cost was calculated at \$5.76 per AUM. In 1993, the grazing fee was \$1.86 per AUM. The Farm Costs and Returns Survey of western livestock operations concluded that BLM and Forest Service grazing fee expenses represent about 3 percent of total cash cost for ranchers.

Table 3.11.1.6: BLM and Forest Service Rangeland Management Program Costs for 1993					
BLM and U.S.F.S. Lands	Rangeland Program Costs		Livestock Grazing Expenses		Nongrazing Expenses
	Total (\$1,000)	Cost/AUM (\$)	Total (\$1,000)	Cost/AUM (\$)	Total (\$1,000)
Management	\$77,045	4.72	\$52,683	3.23	\$24,362
Improvements	\$16,991	1.04	\$12,456	0.76	\$4,535
Totals	\$94,036	5.76	\$65,139	3.99	\$28,897

Source: Range Reform EIS 94, p. 3-10.

3.11.2 State of California (and N.W. Nevada)

The economic impact analysis for the proposed Standards and Guidelines in this study will be applied to 36 of California's 58 counties. Six Southern California counties lie entirely within the California Desert District which is not a part of this Standards and Guidelines decision. The BLM land in two counties, Kern and Inyo, lie primarily in areas administered by the Desert District and only that portion of those counties within the EIS area will be considered in this analysis. Thirteen northern California counties do not have any land in the BLM grazing

program. The counties included in this analysis will be discussed further in the next section of the economic analysis.

The EIS will also address potential impacts for two Nevada counties. The BLM Surprise Field Office (Cedarville, CA) and Eagle Lake Field Office (Susanville, CA) administer 1,563,308 acres of public land in northern Washoe county and 22,347 acres in northwestern Humboldt County, Nevada. All of the economic analysis for the area in Nevada will be analyzed in the county section to follow.

3.11.2.1 California Employment and Income by Major Industry

The most recent statistics on the California economy from the U.S. Bureau of Economic Analysis show that overall employment decreased while personal income rose in the period from 1989 to 1994 (USBEA 1996). But in the agriculture industry, both personal income and employment decreased and agriculture decreased in importance as a proportion of the total California economy. It should be noted that the income from agriculture is proportionally much more important than agricultural employment in California, with income and employment from agriculture representing 10 and 1.66 percent of state totals respectively.

Table 3.11.2.1(a): California Farm and Non-Farm Employment, 1989 and 1994				
	1989	% Total	1994	% Total
Farm Employment	275,489	1.69%	267,629	1.66%
Non-Farm Employment	16,314,476	98.31%	16,074,977	98.34%
Total Employment	16,589,965	100.00%	16,342,606	100.00%

Source: Regional Economic Information System, Bureau of Economic Analysis, 1996

Table 3.11.2.1(b): California Farm and Non-Farm Total Personal Income, 1989 and 1994. (\$000)				
	1989	% Total	1994	% Total
Farm	7,489,757	13.00%	7,163,089	10.00%
Non-Farm	565,765,073	87.00%	695,166,158	90.00%
Total	573,254,830	100.00%	702,329,247	100.00%

Source: Regional Economic Information System, Bureau of Economic Analysis, 1996

3.11.2.2 California Livestock Operations and Production

There were over 22,700 livestock operations in California in 1992 with an inventory of over 5.5 million cattle and sheep. During the 5 year period from 1987 to 1992, the number of beef cattle operations decreased almost 14 percent and sheep operations decreased almost 20 percent. But while the numbers of sheep have sharply declined, the numbers of cattle have increased. The decrease in the number of cattle ranches coupled with an increase in cattle numbers has been a consistent pattern for over 30 years in California.

The increase in the beef cattle numbers, plus good market prices for beef, produced higher total cattle sales (\$) in 1992. But the drop in the lamb/sheep inventory numbers was associated with decreased sales (\$) for that industry.

Table 3.11.2.2(a): Number of California Farms/Ranches 1992 and 5 year Change

Livestock Type	Number in 1992	% Change 1987-1992
Cattle Farms/Ranches	19,097	-13.7%
Sheep/Lamb Farms/Ranches	3,692	-19.8%

Table 3.11.2.2(b): California Livestock Inventory 1992 and 5 year Change

Livestock Type	Number in 1992	% Change 1987-1992
Cattle and Calves	4,702,114	+2.9%
Sheep/Lambs	859,835	-12.2%

Source: 1992 Census of Agriculture, U.S. Department of Commerce, Bureau of the Census.

Table 3.11.2.2(c): California Livestock Sales 1992 and 5 Year Change

Livestock Type	1992 Sales (\$1,000)	% Change 1987-1992
Cattle & Calves	\$1,580,381	+ 8.97 %
Sheep, Lamb, Wool	\$52,197	-0.1184

California agricultural sales totaled approximately 17.05 billion dollars in 1992, and beef and sheep/lamb livestock sales comprised 9.6 percent of that total.

By contrast, in Nevada in 1995, beef cattle and sheep/lamb sales accounted for 37.7 percent of all agricultural sales (Nevada Dept. of Business).

3.11.2.3 Government Transfer Payments -- PILT, Grazing Fees

Payment in Lieu of Taxes

Payment in Lieu of Taxes to California in 1996 totaled \$10,981,192. This figure is five percent higher than the comparable 1993 payment. California and New Mexico receive the highest PILT payments per year. Nevada PILT payments totaled \$7,061,300.

Grazing Fee Revenue Sharing

State and local governments also receive payments under the Taylor Grazing Act. These payments in California totaled \$188,963 in Fiscal Year 1996. This figure is 34 percent higher than in 1993 and 36 percent higher than 10 years ago. Payment to Nevada totaled \$357,583 for 1994 (most recent year).

These payments are based on grazing fees paid for actual use rather than the total forage authorized under a grazing permit as measured in AUM's.

In 1996, 332,117 AUM's were authorized (active preference on grazing leases). 230,537 AUM's were actually used with the grazing fee paid. There were 101,580 AUM's of non-use. (See Section 3.2.2 for a short discussion on non-use.)

3.11.2.4 BLM Rangeland Management Program Expenses

In 1996, the rangeland management program in the EIS study area cost \$1,328,801. This amount represented 58.9 percent of the total California BLM rangeland program cost. The cost break down for the EIS sub-regions is shown in the following table. It was noted previously that the BLM/ Forest Service agency management cost per AUM was \$3.99.

Table 3.11.2.4: Rangeland Program Costs by BLM Grazing Districts					
Office	Labor Costs	Operations	Total	AUM's	Cost/ AUM (\$)
SUSANVILLE	\$ 572,719	\$208,601	\$781,320	207,895	\$3.76
BAKERSFIELD	\$324,306	\$109,586	\$433,892	123,134	\$3.52
UKIAH	\$101,602	\$11,987	\$113,589	9,470	\$11.99
Total	\$998,627	\$330,174	\$1,328,801	340,499	\$3.90

Source: BLM California State Office, Range Management Program, 1996

3.11.3 Principal BLM Grazing Program Counties

The 5.844 million acres of Public Land in the EIS involves 44 counties, 42 in California and parts of two in Nevada (Washoe and Humboldt). While ten BLM Field Offices administer the

public land in this region, six of the offices manage 95% of the livestock numbers as measured by authorized animal unit months (AUM's; 323,250 of 340,499).

These six BLM offices are: Surprise, Alturas, Caliente, Eagle Lake, Bishop, and Hollister. The Public Land administered by these offices lie in 21 separate counties. But most of the Public Land managed by these six Field Offices lies in the following nine counties: Fresno, Kern, Lassen, Modoc, Mono, San Benito, San Luis Obispo, Tulare, California and Washoe, Nevada. The 4,740,883 acres in these counties represent 81% of the total 5.844 million acres of Public Land identified as the total EIS study area (see Map 7).

The nine counties vary greatly in size from over 1.5 million acres of BLM land in Washoe County and one million in Lassen county to 89,506 acres in San Benito County. Table 3.10.3 also shows that only a portion of the BLM land is used for livestock grazing. In one case, Fresno County, only about half of the BLM land is grazed.

Table 3.11.3 Total BLM Acres and Acres Grazed, by County in 1994		
County	BLM Total Acres	BLM Acres Grazed
Washoe, NV (CA BLM)	1,563,308	1,563,308
Lassen	1,009,458	992,665
Kern *	243,400	156,368
Mono	554,985	420,601
Modoc	272,388	227,230
San Luis Obispo	243,742	190,194
Fresno	153,528	78,447
Tulare	119,707	97,050
San Benito	89,506	45,768

Source: Total acres, CA State Office, NV, BLM GABS Program; Acres Grazed, CA BLM Field Offices.

* Acreage figures represent only that portion of Kern Co. that is within the jurisdiction of the Caliente F.O.

Humboldt County, Nevada, is a very large county geographically with over 6.2 million acres. In Humboldt County, the 22,347 acres administered by California BLM represents only a very small amount (one-third of one percent) of the total County land base. Because the land involved is such a small part of the county, and no people reside in this region of the County, no Humboldt County economic impacts will be conducted. The two livestock operators involved reside in Marin and Modoc counties in California. Most of the AUM's are held by the Modoc County resident and economic impacts will be included in the analysis for Modoc County.

3.11.3.1 County Geographic Size, Total Population and Population Density

There is a large difference in population size and density between the nine principal counties. Fresno and Kern counties have major metropolitan areas and over 600,000 county residents. On the other hand, three counties - Lassen, Mono and Modoc - have less than 30,000 people and very low population densities across the county.

Table 3.11.3.1: 1994 Population Size, Acreage, and Population Density, by County			
County	Population	Acreage	Density/Sq Mile
Fresno	729,700	3,851,450	121.3
Kern	609,300	5,223,700	74.6
Tulare	343,300	3,097,220	70.9
Washoe, NV	282,900	4,178,649	43.3
San Luis Obispo	223,700	2,314,070	61.9
San Benito	41,000	890,120	29.5
Lassen	28,100	3,021,190	5.9
Mono	10,400	2,004,410	3.3
Modoc	9,700	2,690,310	2.3

3.11.3.2 County Employment and Income

The following tables rank the nine counties relative to the importance of the agricultural industry as a percentage of total employment and income. Agricultural employment is proportionally most important in Modoc County but agricultural income is the most important in the Central Valley county of Tulare.

Table 3.11.3.2(a): Counties Ranked by Importance of Agricultural Industry Employment			
Location	Agricultural Employment	Total Employment	Agricultural Percentage
California	267,629	16,074,977	1.7%
Modoc County	666	4,106	16.2%
San Benito Co	2,021	16,317	12.4%
Tulare Co	16,809	152,207	11.0%

Table 3.11.3.2(a): Counties Ranked by Importance of Agricultural Industry Employment

Location	Agricultural Employment	Total Employment	Agricultural Percentage
Fresno Co	28,874	361,357	8.0%
Kern Co	16,965	262,281	6.5%
Lassen	596	11,833	5.0%
San Luis Obispo	3,922	110,139	3.6%
Mono	102	7,718	1.3%
Washoe Co, NV	425	194,096	0.2%

Source: Regional Economic Information System, Bureau of Economic Analysis, 1996

Table 3.11.3.2(b): Counties Ranked by Importance of Agricultural Industry Income

Location	Agricultural Income (000's)	Total Income (000's)	Agricultural Percentage
California	7,163,089	702,329,247	1.0%
Tulare County	544,453	5,418,349	10.0%
San Benito Co	49,371	707,677	6.9%
Fresno Co	757,229	12,701,465	6.0%
Kern Co	565,341	10,057,115	5.6%
Modoc Co	4,286	150,765	2.8%
Lassen	7,651	440,807	1.7%
San Luis Obispo	68,978	4,286,114	1.6%
Mono	1,685	211,345	0.8%
Washoe Co, NV	3,465	7,655,901	0.1%

Source: Regional Economic Information System, Bureau of Economic Analysis, 1996

The very low relative importance of agriculture in Washoe County, Nevada is due to the fact that the city of Reno dominates the county's economy. Although Mono County is a rural county with a small population, agriculture contributes only a small percentage of employment

and income there too. These two very different counties have one important economic element in common -- a strong tourism industry. The following table documents the economic impact of travel and tourism in each of the principal counties. It clearly indicates that Mono County, with more than 10 times the employment related to tourism than Modoc County, is very different from the other two small population counties -- Lassen and Modoc.

Table 3.11.3.2(c): Principal Counties Ranked by Travel/Tourism Economic Impact 1994

County	Employment Related to Tourism	Expenditures (\$000) Related to Tourism	Local Taxes (\$000) Generated by Tourism
San Luis Obispo	10,671	\$787,240	\$13,230
Fresno	10,155	\$750,420	\$12,900
Kern	9,894	\$725,710	\$10,570
Tulare	5,100	\$375,250	\$4,310
Mono	4,333	\$310,500	\$5,750
San Benito	948	\$77,470	\$1,090
Lassen	892	\$63,210	\$760
Modoc	367	\$26,440	\$300
Washoe, NV	(no data)	\$3,726,000	n/a

3.11.3.3 Livestock Operations and Production

There is a very large difference in the size and relative agricultural importance of the livestock industry in the nine counties. The livestock industry in Tulare County, with a livestock production value of 223 million dollars in 1995, has over forty times the value of Mono County. But the proportional agricultural importance of the livestock industry is the highest in Mono because over 40 percent of total agricultural production is from livestock production. In two other counties, Modoc and Lassen, the livestock industry represents over ten percent of the value of agriculture in the county.

Table 3.11.3.3: County Livestock Industry Proportion of Total Agricultural Production Value, 1995. (1)

County	Livestock Value Proportion	Livestock Production \$	Total Agricultural Production \$
Mono	41.3%	\$ 5,518,148	\$ 13,357,268
Modoc	17.2%	11,090,000	\$ 64,252,655
Lassen	17.0%	8,038,001	\$ 47,227,000
Tulare	8.5%	223,207,000	\$ 2,610,290,000
San Luis Obispo	8.1%	26,188,000	\$ 321,598,000
San Benito	6.1%	9,867,000	\$ 160,474,000
Kern	4.2%	83,607,000	\$ 1,978,319,000
Fresno	3.6%	115,665,000	\$ 3,167,157,000
Washoe	46.3%	5,798,612	\$ 18,028,000

Selected Counties Department of Agriculture, 1995 Agricultural Crop Reports

(1) Timber not included

Because of large yearly fluctuations in the price for beef cattle, the value of livestock sales and, therefore, the place of livestock sales in the total agricultural economy vary greatly over time. As was pointed out earlier, an 800 pound calf might have brought \$872 in April of 1991. But that same type calf in September of 1995 was worth only \$414, a difference of \$457. The economic importance of livestock sales for a county is also significantly affected by the livestock inventory, the number of animals being raised. From 1992 to 1996 in Washoe County, the number of cattle and calves rose from 31,000 to 33,000; but sheep and lambs decreased from 6,400 to 5,000. Across the state line in Modoc County, the cattle inventory dropped from 53,000 to 45,000 and sheep/lambs dropped from 9,000 to 5,000.

The Modoc County statistics from 1992 to 1995 clearly illustrate the yearly fluctuations and economic volatility of the livestock industry. In 1992, total livestock sales for cattle and sheep totaled \$26,971,000, representing 46.9% of total county agricultural production (1992 Census). 1995 total livestock production was worth \$11,090,000 and was 17.2 % of total agricultural sales in Modoc County. In summary, from 1992 to 1995, the livestock operators of Modoc County experienced a \$15,881,000 decrease in income, representing a 58.8 percent drop in their livestock income.

Table 3.11.3.3(a): Farms with Grazing Permits by County, 1992			
County	BLM Permits	USFS Permits	Total Number of Farm with Permits
Modoc	89	75	128
Kern	55	38	83
Lassen	54	35	68
Fresno	20	21	43
Washoe	20	4	26
Mono	16	17	26
Tulare	13	19	35
S.L. Obispo	12	17	47
San Benito	12	1	15

Source: 1992 Census of Agriculture

3.11.3.4 Government Transfer Payments -- PILT, Grazing Fees

Payments in Lieu of Taxes

Two Federal Government payments to counties are related to the BLM grazing program. The Payment in Lieu of Taxes program compensates the counties because the federal government does not pay property taxes. The Taylor Grazing Act distributes a percentage of the local grazing fees to the counties. Both payments are based on the geographical location of the land. In the EIS study area, it is not uncommon for grazing permit owners to reside in a different county than the location of their grazing allotment. In that case, their fee payments will go to their allotment location counties and not their counties of residence.

Table 3.11.3.4(a): Payment in Lieu of Taxes, by County, 1996.	
County	Payment
Fresno	\$316,955
Kern	\$727,008 (1)
Lassen	\$179,185
Modoc	\$185,233
Mono	\$191,688

Table 3.11.3.4(a): Payment in Lieu of Taxes, by County, 1996.	
County	Payment
San Benito	\$77,334
San Luis Obispo	\$357,141
Tulare	\$746,639
Washoe	\$1,071,123
California Total	\$10,981,192

Source: CA and NV BLM State Offices. (1) Includes the Ridgecrest Field Office payments

Tulare and Kern counties receive over three times the PILT payments of Lassen, Modoc and Mono counties, reflecting the importance of population size in the payment calculation formula.

Grazing Fee Revenue Sharing

The amount received by a county from grazing fees is greatly influenced by which legislative formula applies. Kern County's 1996 payment of \$22,487 was twice that received by Lassen County, even though Lassen has more AUM's, because the share percentages were 50% versus 12.5%.

Washoe County, NV received \$21,043 in grazing fees revenue sharing for 1996. Three BLM Districts were involved. The contribution of each was: NORCAL EAST \$14,314, (the Surprise and Eagle Lake areas combined), Winnemucca \$2,649 and Carson City \$4,080. Humboldt County, NV received \$40,186.44 in grazing fee revenue sharing for 1996, but only \$104.92 for the lands managed by the Surprise Field Office.

Table 3.11.3.4(b): Grazing Fee Revenue Sharing by County, 1996 CA / 1994 NV	
County	Payment
Kern	\$22,487
Washoe (NV)	\$21,043
San Luis Obispo	\$14,895
Lassen	\$11,820
Fresno	\$6,511
Modoc	\$3,666
Mono	\$2,974

Table 3.11.3.4(b): Grazing Fee Revenue Sharing by County, 1996 CA / 1994 NV	
County	Payment
San Benito	\$2,900
Tulare	\$1,340

Source: CA BLM State Office, Range Management Program 1996 data; Harris, Thomas, Federal and State Land-Based Payments in Nevada, 1994 data, unpublished report, U. Nevada, Reno, Department of Applied Economics and Statistics, 1996.

Table 3.11.3.4(c): BLM Authorized Grazing AUM's by County, 1996	
County	Number of Authorized AUM's
Kern	23,114*
Washoe (NV)	94,394**
San Luis Obispo	26,779
Lassen	80,217
Fresno	13,784
Modoc	28,361
Mono	33,509
San Benito	6,453
Tulare	3,306

* Includes only the AUM's administered by the Caliente Area Office

** Does not include the grazing AUM's administered by the Carson City and Winnemucca, NV Field Offices.

3.11.3.5 Permit Value

As a general rule, a ranch with a federal grazing permit is worth more than a ranch without a permit. In theory, the value of the permit at least partially reflects the capitalized difference between the grazing fee and the competitive market rate that could be charged for federal forage. Research has found that permit values are influenced by a variety of market forces at different times and in different places (BLM 1994, p 3-71). The permit value in Modoc County has declined about \$6 per AUM since the 1980's. Lending institutions include the value of the permit in loans and sales. In addition, the Internal Revenue Service considers the value of permits when property is transferred. In Modoc County in 1996, the County Tax Assessor's Office valued the permit at \$30 per AUM. A study of sales of BLM and Forest Service grazing permits in 1991 found a sale price of approximately \$30 per AUM (Modoc County Assessor). Hypothetically, if a ranch with land and buildings worth one million dollars had a grazing permit for 1000 AUM's, the permit would add \$30,000 to the value of the ranch ($\$30 \times 1000 = \$30,000$). Thus, any change in the permit, such as altering the number of AUM's authorized, or raising the AUM grazing fee, could change the benefit of the privilege to graze on federal

land and reduce or eliminate the "value" of the permit. The discussion of permit value must include an understanding that federal law states that the issuance of grazing permits creates no right, title, or interest in federal lands or resources.

3.11.3.6 California Possessory Interest Tax

In California, the assessed value of grazing permits is subject to a possessory interest tax. Taxable possessory interests are property interests in publicly owned real property. Both grazing permits and agricultural leases give rise to taxable possessory interest.

In Modoc County, taxable possessory interest grazing rights had an assessed value of \$4,343,419 for the 1990 tax roll. This equates to approximately \$44,000 in taxes for the county. The formula for calculating the assessed value involved four components including a sales price of \$30.00 per AUM and the 1991 AUM grazing fee of \$1.97.

3.11.3.7 Farm Real Estate Values

The value of land has both long and short term significance. It is a source of financial worth in the long term, affecting retirement and inheritance; and it is the collateral for loans in the short term.

In 1995, California rural land prices averaged \$2,215 per acre, while Nevada prices averaged \$289 per acre (Economic Research Service, USDA, 1996). Over the past 10 years (1986 - 1995), this represents a 28 percent increase in land value in California and a 32 percent increase in Nevada. An average 2,000 acre ranch would cost \$4,430,000 in California compared to \$578,000 in Nevada. That average Nevada ranch would have increased in value over the past ten years by \$131,206.

CHAPTER 4: IMPACT ANALYSIS

4.1 INTRODUCTION

Chapter 4 describes effects on the human environment of the proposed action and other alternatives described in Chapter 2.

Environmental consequences can be categorized and presented in many ways. Some are the direct effect of implementing an action. Others are more indirect, occurring later or farther away. Some tend to be short term. Others last longer. Some effects are adverse. Others are beneficial. Some are mainly physical or biological. Others are economic or social. This chapter discusses environmental consequences in all of these ways.

We have done an analysis of the Standards in each Alternative, based upon whether the standards addressed the fundamentals of rangeland health, as required in the regulations at 43 CFR 4180.2 (Fed. Reg. 1995). Although there are some differences in the way the standards are worded, all of the alternatives except the fallback standards address the fundamentals of watershed function, nutrient cycling and energy flow, water quality, and habitat for special status species and native plant and animal populations. Some of the differences are highlighted in the analysis, while Appendices 14 and 15 specifically address the soils and water quality standards.

We have also done an analysis of the guidelines under the different alternatives. In all cases the guidelines contain the necessary tools to enable us to meet the standards of rangeland health. In some cases, the guidelines do not specifically address certain topics as directed by the regulations, and there may be some concern that this failure to directly address those topics would result in failure to meet the standards. These concerns are addressed in some of the following analysis, while a table showing this analysis and comparison is in Appendix 16.

Appendix 19 is a summary table that shows a side-by-side comparison of the impacts for each alternative as identified in this chapter.

4.2 IMPACTS COMMON TO ALL ALTERNATIVES

4.2.1 GRAZING MANAGEMENT

As required by the regulations, the fallback standards and guidelines (identified in Alternative 3) became effective on August 12, 1997. These are interim standards and guidelines which will be applied to all BLM grazing allotments until state-wide standards and guidelines are developed and approved. In order to prepare for complying with the fallback standards and guidelines, as well as any subsequent standards and guidelines that may be developed through this current process, the field offices evaluated current information obtained from past monitoring and from records regarding current conditions with a focus on the fundamentals of rangeland health. Where information was available, each field office identified which allotments were meeting or making significant progress toward meeting standards based upon the following primary topics for rangeland health: soils (including soil

erosion), riparian and wetland function, water quality, and habitat (including healthy plant communities and animal habitats).

Out of 459 allotments assessed, 387 were identified as meeting standards (Category 2 -- see explanation of implementation categories in Chapter 2). These allotments are identified in the implementation plan in Appendix 21. Fifty-nine (59) of the allotments assessed did not meet at least one of the standards due to current livestock grazing practices. These allotments are identified in the Category 1 table in Appendix 21. The severity, scale, and overall magnitude of the conditions not being met are not known at this time for every allotment. This information will be identified in the site-specific evaluations that are currently underway. There were 13 allotments identified as not meeting standards due to causes other than grazing. These causes included fire (or lack thereof), roads, recreation, mining, wild horses or burros, and weed infestation. Note that the number of allotments differs from the number included in the draft EIS for the reasons described in Chapter 3, Section 3.2.1.

Current rangeland health conditions are not yet known on 190 allotments (about 29% of the allotments in the EIS area) and are not included in the present grazing and economic analysis. In many of these cases, these are "C" or custodial allotments that have not received sufficient monitoring to produce data on ecological conditions. Some other types of allotments (I and M) also lack up-to-date ecological condition assessments, mainly as a result of past budget limitations. Because most of these allotments are quite small, the proportion of acreage not included in this analysis is much lower than the proportionate number of allotments.

Implementation of any of the alternatives would approach meeting the fundamentals of rangeland health where the cause is from current grazing related activities. Allotments where causes other than grazing are the reasons for the fundamentals not being met, are outside of the scope of this analysis and the alternatives identified would not specifically correct those problems.

The consequences of implementing the management measures and the rate of implementation predicted would basically be the same in Alternatives 1, 2, and 3. The consequences would be different from these in implementing the rapid improvement/rapid recovery alternative -- Alternative 4, and the preferred alternative -- Alternative 5, in that both the rate in achieving improvement in rangeland health conditions and the implementation of the alternative would cause some different consequences.

In all alternatives there would be a need to implement or install range improvement projects to facilitate the enhancement of vegetative conditions either through vegetative treatment practices and weed control or to place facilities on the rangelands to support the grazing management of livestock. Many of the areas known to be in need of these projects are within Wilderness Study Areas or designated Wilderness Areas, predominately within the Great Basin Floristic Province. The management policies for these areas are restrictive about the type of projects that may be placed in these areas as well as the methods for implementing or installing the projects. The projects must be compatible with the existing or potential values for wilderness. Current policy guidance is that no projects may be developed within Wilderness Study Area unless they would enhance the wilderness values. Prior to implementation, each individual project would require a site-specific analysis in weighing any projected wilderness enhancement values from the project against the magnitude of the predicted impairment of these values that could occur from the project itself or influences

from the use of the project. Therefore, there is an assumption that the opportunities to implement some of the needed range improvement projects within these areas would be limited and would affect all alternatives to the same degree.

There will be reductions and limitations of grazing use on some allotments under all alternatives in order to restore soil and vegetative conditions and minimize existing impacts from grazing activities. This would result in a decrease of the number of AUMs of grazing authorized due to shortening or changing the season of use, establishing grazing utilization thresholds, or excluding areas from grazing.

All of the alternatives include using herding practices, constructing new fences, installing additional livestock watering sources, and changing the class of livestock to facilitate improved grazing use that will result in meeting rangeland health conditions.

See Section 4.3.1 for a description of major differences between the alternatives.

4.2.2 UPLANDS

4.2.2.1 Soils

Implementing the rangeland health standards and guidelines will result in positive impacts to upland soils which will improve overall watershed health slowly over a long time frame. Grazing management that results in greater plant litter retention will have slow but complex results. Surface litter plays a complex role in range soil health. It cycles plant and animal nutrients, reduces raindrop impact, traps mobilized sediment, insulates and moderates soil temperatures, conserves soil moisture, and builds soil structure. The changes expected to occur are: reduced surface crusting, reduced erosion, increased biological activity, increased permeability, increased root mass, increased fertility, increased soil cover, and increased soil moisture.

Many Field Offices have allotments with noxious weeds and invasive weeds which may inhibit attainment of soil condition standards. Specifically the standards requiring "a variety of root depths, diversity of plant species and representation of the desired plant community" are not being met. For example, the Susanville RAC Area has at least three grazing allotments that resource managers suspect will not meet the soil condition standards regardless of which alternative is implemented. Approximately 20 percent of these allotments contain areas which are dominated by medusahead, an exotic annual grass species which is extremely difficult to eradicate. Other Field Offices have grazing allotments with areas dominated by yellow star-thistle which will not significantly change under any alternative. The long recovery times or high treatment costs associated with making significant progress in these weedy areas indicate that implementation of any of the alternatives would not significantly change this condition.

See Section 4.3.2.1 for a description of the major differences between the alternatives.

4.2.2.2 Vegetation

Annual Grasslands

No changes are expected in the species composition of annual, herbaceous species, since the residual dry matter (RDM) level guidelines to be adopted under all of the alternatives are basically the same as those that are currently employed. There will be a slight expansion of RDM guidelines to include some lower priority, C-category allotments that were previously excluded from these requirements, particularly in the area managed by the Hollister Field Office. The amount of public lands in these allotments, however, is small. This change, therefore, is considered to be minimal.

Where desired plant community objectives specify them, perennial grasses are expected to increase under all alternatives. Episodic recruitment of oaks and shrubs (especially allscale in the San Joaquin Valley) will be allowed to occur through reduction or removal of grazing and browsing pressure on these species during the critical period of establishment. There will likely be no change in fire frequency, except where prescribed burns are employed to establish perennial grasses, to improve the habitat for special status species, or to manage fuel levels.

The rate of change is expected to be similar for all alternatives.

Sagebrush Steppe

The following changes are expected to occur under all alternatives:

- * Increased cover and vigor of perennial grasses, where these now occur or are likely to occur based upon the availability of seeds in the seedbank.
- * Increased potential to move through successional stages or have a variety of seral stages on the landscape.
- * Increased soil cover of both live vegetation and litter.
- * More uniform distribution of litter and incorporation of litter into the soil profile.
- * Better root distribution throughout the available soil profile.
- * Increased species diversity.
- * Increased photosynthetic period.
- * Increased vegetation structure.
- * Increased frequency of wildfires due to higher accumulation of live vegetation and litter.
- * Decreased rates of juniper expansion due to mortality of young trees from increases in fire frequency.

- * Increased diversity of age classes of aspen.
- * Where desired plant community objectives include a shrub component, shrubs will be maintained or increased, and their vigor improved.
- * Where desired plant community objectives do not include a shrub component, shrubs may decrease because of increased competition from perennial grasses and forbs.
- * Episodic recruitment of shrubs, trees, and perennial herbs will be allowed to occur by reducing or removing grazing and browsing pressure during the critical period of establishment.

These changes are expected to be fastest under Alternative 4. They are expected to be the slowest under Alternative 3 because of the lack of utilization guidelines for perennial key species under that alternative. Under Alternatives 1 and 2, changes will likely be faster for the area covered by the Bakersfield and Ukiah RACs because of the more conservative utilization guidelines adopted by those RACs over that of the Susanville RAC. Although Field Offices covered by the Susanville RAC would develop site-specific utilization guidelines, this would take time to accomplish and therefore slow down the pace of the changes indicated above. The Susanville RAC has adopted interim utilization guidelines, but these are basically the same as in existing land use plans, and are not as conservative as those adopted by the Bakersfield and Ukiah RACs. Therefore, these interim guidelines are not expected to result in any changes in the short term. Under Alternative 5, the preferred alternative, utilization limits similar to those of Bakersfield and Ukiah are proposed for Susanville. This would result in similar rates of increase in all three RAC areas under that alternative.

4.2.3 RIPARIAN-WETLANDS and STREAM CHANNELS

4.2.3.1 Overview

In the Wetland/Aquatic section of Chapter 3 we discussed using the BLM's Functioning Condition Assessment process to judge the "health" of standing-water (Lentic) acres and flowing-water (Lotic) miles, and noted the fact that the process can also be used to estimate change in health status. Therefore, we used the Functioning Condition Assessment process to compare the current "health" status with the estimated status under management by alternatives. This was done via a Professional Judgement Assessment (PJA), where resource professionals were asked to use their own personal experience, skill, perspective, and familiarity with various wetland/riparian areas and streams to estimate future functioning condition ("health") status under the different alternatives. Table 4.2.3 shows the difference between current standing-water (lentic) acres "health" status and management under the different alternatives and Table 4.2.3(a) does the same for flowing-water (lotic) miles.

TABLE 4.2.3: Lentic Habitat Functioning Status (%) Acres

Status	Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Proper Functioning	27 %	83 %	83 %	83 %	83 %	83 %
At Risk	71 %	16 %	16 %	16 %	16 %	16 %
Non-Funct.	2 %	1 %	1 %	1 %	1 %	1 %

Both tables illustrate a major difference between current "health" status and estimated future "health" status through management under any of the alternatives; however, they also indicate that there would be no difference in future "health" status between alternatives. Under current management 27% of Lentic areas are in Proper Functioning Condition (PFC). It is estimated that management under any of the alternatives would increase the amount of Lentic areas in PFC to 83%. The Lentic habitats in PFC would increase from 28% to 62%. However, the time-frame for moving functioning-at-risk wetland/aquatic habitats into proper functioning condition would be shorter under Alternative 4 as Alternative 4 requires choosing the action that will improve the functioning condition as fast as possible, rather than a gradual approach.

TABLE 4.2.3(a): Lentic Habitat Functioning Status (%) Miles

Status	Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Proper Functioning	28 %	62 %	62 %	62 %	62 %	62 %
At Risk	69 %	36 %	36 %	36 %	36 %	36 %
Non-Funct.	3 %	2 %	2 %	2 %	2 %	2 %

Approximately 99.6% of the indicated change of At-Risk Lentic areas and 70% of the At-Risk Lentic areas moving to Proper Functioning status is the result of PJA data provided by the Surprise Field Office. This can be explained by the fact that Surprise manages approximately 10,000 acres more of standing-water wetlands and approximately 600 miles more of flowing-water riparian than the other nine offices combined. Also, the Surprise Field Office has a much higher percentage of the wetlands they manage currently in Functional-at-Risk status.

4.2.3.2 Vegetation

The following changes are expected to occur under all alternatives:

- * Increased shrub and tree layers, where the potential for these species exists.
- * Improved age-class distributions of trees and shrubs.
- * Increased cover and vigor of herbaceous perennial species.

- * Increased streambank cover.
- * Movement toward later seral stages.
- * Increased diversity of plants and animals.
- * Increased width of riparian zone.
- * Decrease of nonriparian species (such as sagebrush and rabbitbrush) in the riparian zone, as the water table rises.

The above changes are expected to occur fastest under Alternative 5, Alternative 4 and under Alternatives 1 and 2 for the area covered by the Bakersfield RAC. This is because of the conservative minimum stubble heights and utilization guidelines adopted for the entire project area under Alternatives 5 and 4 and for the Bakersfield RAC under Alternatives 1 and 2.

The area covered by the Susanville RAC under Alternatives 1 and 2 will likely experience these changes faster than the Ukiah RAC under the same alternatives, because the Susanville RAC has adopted interim utilization guidelines that would take place immediately upon approval of the standards and guidelines, while the Ukiah RAC had directed that utilization levels be set on a site-specific basis.

Alternative 3 would result in the slowest rate of change, because all riparian utilization guidelines would be developed on a site-specific basis, a process that will take more time to implement.

The above changes would apply to most areas. However, areas that are severely degraded or non-functional would not be changed without major work, or they would take a much longer time to recover. There are some non-functional areas that may no longer have the potential for recovery.

4.2.3.3 Riparian Hydrology and Water Quality

Under all alternatives, we would see a general enhancement and improvement in riparian and wetland conditions. This improvement would be reflected in hydrologic function and water quality. As uplands and riparian areas improve, peak runoff would be reduced and increased riparian vegetation would protect and stabilize streambanks. Stream channels in many locations would narrow, and peak flows would be spread across the floodplain, thus increasing groundwater recharge. This increased groundwater recharge would increase the amount of streamflow throughout the year in perennial streams and increase the duration of streamflows in intermittent streams. Also, as peak flows spread across the floodplains, sediment would be deposited, enriching soils and building streambanks.

We would also see improvements in water temperatures (lower in summer and higher in winter) and dissolved oxygen levels due to improvements in stream channel morphology and increased growth of over-hanging vegetation that would shade the water. Increases in vegetation would also filter out more fecal material, thus reducing the amounts of nutrients and pathogens in the water. These improvement would occur a bit faster under Alternatives 4

and 5 as there is more focus and attention given specifically to water quality concerns under these alternatives.

Following Secretarial approval of the rangeland health standards, and the State of California's approval of the water quality plan with its Best Management Practices (see Appendix 10), BLM will manage livestock under both sets of guidelines to meet California's requirements for water quality for beneficial uses. BLM will do the same thing, using the rangeland health standards and the Best Management Practices in Nevada's plan, to manage livestock grazing to meet Nevada's water quality requirements.

Most of the concerns with livestock grazing activities meeting numerical drinking water objectives would be focused where the water would be directly used for drinking water without treatment or where it may be determined that treatment for potability requirements is infeasible due to the influence of livestock use. Most stockwatering facilities in Nevada and California are excepted from meeting numerical standards for drinking water.

There are some differences between alternatives. These are primarily in emphasis and specificity of direction, and are explained in Section 4.3.3.

4.2.4 WILDLIFE

4.2.4.1 Wildlife Communities

Implementation of the Standards for Rangeland Health would promote the ecological processes necessary to maintain and/or improve wildlife habitats in BLM grazing allotments. The standards have been developed as indicators of healthy rangelands and, as such, would promote the long-term quality of the living (biotic) and non-living (abiotic) components of wildlife habitats: food, cover, water, and space. Maintaining the processes of soil and plant community development would provide the mechanisms necessary for rangeland communities (and thus wildlife habitats) to exhibit resistance and resilience to extreme events such as drought, fire, or rainstorms (NRC 1994). However, the benefit or harm to a particular wildlife species, or group of species, would depend upon the current habitat condition, trend, and management objective(s) at the pasture or allotment level where the standards would be applied.

In general, the implementation of the standards would be expected to improve or maintain a wide variety of wildlife habitats on the BLM lands by an increase in vegetative ground cover, the diversity of plant species, and the variety of vegetative layers (grass, shrubs, young trees, mature trees). Where the potential exists, plant communities would trend to later seral stages that would include more grass and herbaceous cover, greater diversity of native plants, and an increased structure of shrubs and trees. However, as described in the vegetation section, many acres of upland perennial rangelands would not change in the composition or structure of native plant species in the short or long term since these species have been eliminated and seed sources are not available in the soils. The greatest changes are expected to occur in the wetland/riparian habitats where potential for vegetation change still exists. This would be an important improvement of wildlife habitat on BLM lands since these habitats represent the most productive habitats on the western rangelands (Thomas et al. 1980).

Habitat improvement would be the result of designing livestock management practices to meet the standard's indicators (e.g., ground cover, litter, variety of age classes, plant reproduction, streambank protection, water quality, etc.). This would also result in a wide variety of wildlife habitat elements necessary for diverse animal assemblages that occur when habitats provide a diversity of plant and animal foods, hiding, escape, nesting, and thermal cover, and more available water. Using migratory birds as an example, as the structure of the vegetation becomes more complex, opportunities for nest sites and food resources increase, allowing additional birds to inhabit the area (Douglas et al. 1992).

Based on the CWHR habitat models, wildlife habitat suitability would improve for many species of wildlife, while the same vegetation changes would reduce the habitat value for many others. In general, species that tend to be "generalists" in food and habitat selection are more abundant in open habitats and may find the increased vegetation cover less suitable. In contrast, species that are more sensitive to habitat structure, that also tend to be less abundant and of management concern, are benefitted by increased vegetative cover and the addition of shrub and tree layers. This is especially true for many neotropical migrant birds that readily respond to increased diversity and complexity of riparian and woodland vegetation.

Annual Grassland Habitats

The implementation of the standards and guidelines would maintain a minimum level of residual dry matter (RDM) on the ground at all times of the year in both the long and short term periods. An emphasis on RDM would increase ground cover for nesting birds and small mammals. This would be beneficial for some species (e.g., meadow larks, lark sparrow, grasshopper sparrow, California vole, mule deer) but detrimental for others (e.g., western spadefoot, mountain plover, horned lark, American robin, Heermann's kangaroo rat, giant kangaroo rat, side blotched lizard, coachwhip snake). For many other species, the density of grass cover will have little discernable affect (CWHR 5.2 1996).

More noticeable effects to wildlife communities would be seen in the alkali shrub and oak woodlands where changes in shrub and tree cover and structure would determine which wildlife species would be present. Where allotment objectives include a shrub or woodland component, grazing management practices would be implemented to maintain or increase the amount of shrub/tree cover of native saltbush or oak species on appropriate sites. This would maintain or improve the structural diversity for animals requiring shrubs and trees for nesting, escape and thermal cover.

Sagebrush Steppe Habitats

The proposed standards and guidelines would increase the vegetation structure and species diversity of the sagebrush steppe communities through the increases in cover and vigor of the perennial grass and herbaceous plant species. This would improve the quality of habitats for those species that respond to greater cover of plants and litter for feeding and concealment (e.g., western meadowlark, savannah sparrow, vesper sparrow, montane vole, Belding's ground squirrel, sagebrush lizard; Zeiner et al. 1990). Where shrub species are included as allotment objectives, the improvement and maintenance of sagebrush, bitterbrush, rabbitbrush, greasewood, mountain mahogany, service-berry, snowberry and other important cover and forage species would occur. These are important habitat elements for many wildlife species such as mule deer, pronghorn, pygmy rabbit, white-tailed hare, sage

grouse, Brewer's sparrow, sage sparrow, green-tailed towhee, and gray flycatcher (Zeiner et al. 1990).

The increase in the likelihood of wildfires from increased herbaceous cover would promote a mosaic of shrub and grassland habitats that would support a wide diversity of wildlife in the sagebrush communities. Since the pattern across the landscape would include an assortment of vegetation types and seral stages with more edges between habitats, the richness of wildlife species would increase over the long term (Thomas et al. 1979).

Juniper, Pinyon-Juniper

The implementation of the standards and guidelines are expected to increase the amount of plant cover and litter that may influence fire fuels. As such, the amount of pinyon-juniper and juniper habitats is expected to be altered by the increase in the frequency, intensity and size of wildfires than may result from increased vegetation cover. The post fire communities would be beneficial for some species like mule deer (Stager and Klebenow 1986) and pronghorn in the short and long term as shrubs and forbs become more abundant. The loss of Pinyon trees would reduce seed crops for Pinyon jay, Clark's nutcracker, Steller's jay, scrub jay, and black-billed magpie, while reductions in juniper may affect Townsend's solitaire, American robin, and western bluebirds that depend on juniper "berries" during the winter months. In addition, the number of bird species breeding in these woodlands that are influenced by pinyon pine density, tree density, and foliage volume would be reduced within burned areas. However, the overall landscape across BLM lands is not expected to be altered to an extent that would place these wildlife species or communities at risk.

Wetland/Riparian Habitats

The proposed standards and indicators will promote the maintenance of the process and functions necessary to improve and maintain healthy riparian habitats. Rosgen (1993) stated that from his measurements, over half of the total sediment produced in large watersheds is being contributed by accelerated bank erosion processes. He noted that streambank erosion rates can be reduced by several orders of magnitude if riparian vegetation is maintained. Rooting depth and density becomes a major key in streambank stability. Grazing strategies that change the density and composition of species with good rooting characteristics have an exponential impact on bank erosion. It has been demonstrated that good grazing practices can actually improve the stream and riparian condition and that grazing management strategies have to be adjusted based on the sensitivity of the various streams in a watershed (Rosgen 1993).

Waterfowl and shorebirds residing in wetland habitats would benefit from improved wetlands meeting proper functioning condition objectives. The riparian and wetland habitats meeting these objectives would receive less sediment which would encourage aquatic macroinvertebrate production and plant growth. This would result in more food for these birds and better shoreline and emergent vegetation cover for nesting, brood rearing, migration, and feeding activities. Since these habitats are quick to respond to changes in grazing management, the improvements are expected in both the short term and long term periods.

4.2.4.2 Big Game

The implementation of the standards and guidelines would promote the ecological functions and processes that favor healthy and sustainable big game habitats. Where the standards are not being met, livestock grazing management would consider how the timing and intensity of grazing use could be changed to maintain a specific plant community or desired successional changes. The use of grazing to manipulate habitat for big game represents an effective and ecologically sound management tool (Schmidt and Gilbert 1978).

Mule deer

It has been recognized for several decades that livestock grazing has played an important role in the creation and maintenance of shrub communities that support mule deer in the western states (Schmidt and Gilbert 1978; Walmo 1981). Longhurst (1981) stated that the cumulative impact of long-term livestock use is likely the paramount influence which has produced and maintained seral vegetation for deer. This is especially true in the Great Basin where sagebrush and other successional shrub species dominate areas that were more interspersed with perennial grasses under pristine conditions. Recent invasions of cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*) have altered both the forage composition and the influence of fire in these communities by providing a fine fuel cover that increases fire frequency and intensity and eliminates shrubs and other herbaceous plants. Livestock grazing may be an important tool to manage these fine fuels through prescribed grazing that would be implemented through the standards and guidelines. Where objectives include maintaining the shrub component of vegetation, the maintenance of diverse shrub and forb species in the plant communities under the proposed standards would help improve and maintain forage quality on mule deer ranges.

In many of the pinyon-juniper habitats in eastern California, there has been an increase in the density of these tree species with a decrease in the shrub and grass/forb vegetation layers. While the increase in the tree species is an improvement in mule deer cover (Longhurst et al. 1981), a closed pinyon-juniper stand with a sterile understory is a loss of palatable mule deer forage and is considered degraded mule deer habitat. Livestock grazing may accelerate this increase in pinyon and juniper but can be also be used as a management tool, along with fire management, to reduce the cover and reproduction of these tree species and maintain the shrub seral stages (Schmidt and Gilbert 1978). Implementation of the rangeland health standards would improve mule deer habitat where herbaceous and shrub species replace dense pinyon-juniper stands due to changes in grazing and fire management.

On California's annual ranges, the composition of introduced annual vegetation has increased carrying capacity for mule deer; and continued livestock grazing at moderate intensity is necessary to maintain high carrying capacity for deer (Longhurst 1981). The standards and guidelines for the annual ranges promote both the composition of these annual species and the maintenance and diversity of native vegetation (especially oak species) that will benefit mule deer.

The proposed standards and guidelines would place an emphasis on the function and condition of riparian habitats. This would be of benefit to mule deer populations that depend on these riparian habitats for forage, cover and fawning habitat (Longhurst 1981). Livestock grazing practices would be designed and implemented to meet the standards for proper

functioning condition and diverse composition and structure of riparian habitats. This would promote a more complex riparian community that would benefit mule deer habitat quality.

The interaction of livestock grazing, fire, and mule deer use on plant community production, composition, succession, and ecological processes would be key discussion points in developing management objectives on grazed allotments. Mule deer habitats are expected to be maintained or improved as a result of such discussions.

Elk

The proposed standards and guidelines would improve or maintain elk habitats on BLM upland and riparian habitats. The increase in plant cover and native plant diversity would favor later seral stages and grass production that are important for elk. Livestock grazing practices that increase and maintain the grass component of rangelands would favor elk habitat over mule deer (Schmidt and Gilbert 1978). The maintenance of residual dry matter on annual ranges would also favor taller grass species over forbs, and this would also be beneficial to elk. However, since elk populations are not limited by forage availability or current habitat conditions, populations would meet management objectives and continue to be regulated by Department of Fish and Game management strategies.

Pronghorn

The implementation of the standards and guidelines would benefit pronghorn populations on BLM lands by promoting ecological functions and processes that create and maintain diverse plant communities. Pronghorn thrive best on ranges with a diversity of grass-forb-shrub habitat types, but are widely adaptable to different forage conditions (Clary and Holmgren 1981). The most favorable pronghorn habitats are characterized as those with 50% living vegetation, a mix of grass, forbs and shrubs, a variety of grass, forb and shrub species, succulent forbs, a variety of vegetative communities, and relatively low vegetative height (Schmidt and Gilbert 1978). Many of these attributes are considered in the standards (and indicators) and are expected to be promoted in the implementation and evaluation of grazing management. Little change would be expected on the upland habitat sites in the short term, but an improvement of vegetation composition and structure for pronghorn would occur over the long term as plant communities become more diverse with native plant species. A more rapid improvement of riparian habitats used by pronghorn (grass meadows) is expected. The improvement of these habitats would be considered as high priorities in the application of the standards and guidelines to meet management objectives.

In some areas, it has been concluded that livestock-pronghorn interactions affect pronghorn habitat use during the winter season (Clary and Holmgren 1981) or fawning season (McNay and O'Gara 1981). In such cases where the standards are not being met to support native species, grazing management practices could be altered within the guidelines to meet management objectives that would improve pronghorn reproduction.

4.2.4.3 Upland Game

The most noticeable changes to upland game habitats would be in the improvement of riparian habitats that provide important food, cover and water for these bird and mammal species. While changes are not expected in the short term in the upland vegetation types,

rapid improvement of riparian habitats is expected where grazing management is altered to meet rangeland health objectives. In the long term, the upland habitats are expected to improve to a minor degree as vegetation cover and diversity increases. The increase in wildfire activity in the upland plant communities will help promote this diversity.

4.2.4.4 Fisheries

The number of miles of streams and acres of wetlands meeting proper functioning condition criteria would increase with the implementation of the standards and guidelines, thus improving aquatic habitats. The amount of sediment would be reduced, streambank structure would be improved to provide overhanging vegetation and banks, and stream shading would increase. In many cases, the stream channel would narrow and deepen, pool development would accelerate, and streambanks would stabilize. Increased vegetation cover and structure would reduce summer stream and inter-gravel water temperatures which would increase dissolved oxygen levels, thus increasing stream biological activity (Platts 1990). The biomass of fish would increase as aquatic habitat conditions improve.

Platts (1990) reviewed a broad variety of livestock grazing practices and how successful they can be in meeting wildlife and fisheries habitat objectives. He states that "consideration of streamside zones in the development of grazing strategies provides the best opportunity for the development of compatible grazing strategies." Many of his criteria for success are included in the proposed riparian standards and indicators. Thus, the proposed standards and guidelines provide an opportunity to develop appropriate grazing practices to meet proper functioning condition and improved riparian habitat conditions, where needed, to meet fisheries habitat objectives.

4.2.5 SPECIAL STATUS SPECIES

Special Status Plant Species

Determinations concerning the effects of livestock grazing on special status plant species were made by Field Office botanists or other specialists with special status plant program responsibilities. They based these determinations on a variety of sources, including research, monitoring, professional judgement, and consultation with other sources, including the California Natural Diversity Data Base. The effects of livestock grazing given in Appendix 11 apply only to the effects on BLM lands, not to the effects grazing may have on lands of other ownership.

Twenty-four of the 159 special status plants known to occur within the project area are negatively impacted by current grazing management practices (Appendix 11), although for several of these species the impacts occur only in a small portion of their ranges.

The measures that will be taken to remove the grazing impacts to these species will be developed on a site-specific basis by individual Field Offices. The types of actions that will be taken may include one or more of the following: reductions in stocking rate, changes in season of use, protection by fencing, or redistribution of livestock away from special status plant populations (by herding or locating mineral blocks and water sources well away from

the populations). If none of these actions works or is infeasible, livestock grazing may be eliminated entirely from the allotment or pasture containing the species.

The following species would be expected to respond positively to changes in grazing management under all five alternatives:

Geyer's milk-vetch (*Astragalus geyeri* var. *geyeri*)
Long Valley milk-vetch (*Astragalus johannis-howellii*)
Mono milk-vetch (*Astragalus monoensis* var. *monoensis*)
Tonopah milk-vetch (*Astragalus pseudiodanthus*)
Inyo mariposa (*Calochortus excavatus*)
Alkali mariposa lily (*Calochortus striatus*)
Shirley Meadows star-tulip (*Calochortus westonii*)
San Benito evening-primrose (*Camissonia benitensis*)
Red Hills soaproot (*Chlorogalum grandiflorum*)
Mariposa clarkia (*Clarkia biloba* ssp. *australis*)
Crosby's buckwheat (*Eriogonum crosbyae*)
Temblor buckwheat (*Eriogonum temblorense*)
Boggs Lake hedge-hyssop (*Gratiola heterosepala*)
Sierra Valley ivesia (*Ivesia aperta* va. *aperta*)
Alkali ivesia (*Ivesia kingii* var. *kingii*)
Pale-yellow layia (*Layia heterotricha*)
San Joaquin woolly threads (*Lembertia congdonii*)
Panoche pepper-grass (*Lepidium jaredii* ssp. *album*)
Sagebrush loeflingia (*Loeflingia squarrosa* var. *artemisiarum*)
Congdon's lomatium (*Lomatium congdonii*)
Mono Lake lupine (*Lupinus duranii*)
Kelso Creek monkeyflower (*Mimulus shevockii*)
Mono County phacelia (*Phacelia monoensis*)
Sequoia gooseberry (*Ribes tulareense*)

These positive changes would likely be realized faster under Alternative 4 than under the other four alternatives.

Six special status plant species that are in grazing allotments may be negatively impacted by current grazing management practices, but not enough is presently known about grazing effects upon these species to make this determination. These species are:

Walker Pass milk-vetch (*Astragalus erterae*)
Beaked clarkia (*Clarkia rostrata*)
Piute cypress (*Cupressus arizonica* ssp. *nevadensis*)
Recurved larkspur (*Delphinium recurvatum*)
Munz's tidy-tips (*Layia munzii*)
Piute Mountains navarretia (*Navarretia setiloba*)

Information to help determine how grazing affects these species will be collected through inventory and monitoring efforts under all five alternatives. However, this would be expected to be accomplished faster under Alternative 4. If this information indicates that livestock grazing is negatively impacting any of these plants, the management changes that followed this determination would be expected to positively affect these species.

Special Status Animal Species

The effects of livestock grazing are quite variable among the listed species. Appendix 12 identifies the state and federally listed species on BLM lands in California and indicates whether livestock grazing is considered a compatible management practice.

The proposed standards and guidelines would promote the ecological function and processes necessary to maintain and improve listed species habitats on BLM lands. Since listed species would be considered in meeting rangeland health standards, livestock grazing practices would be designed to promote the conservation and recovery of these species. Where existing livestock grazing is not compatible with listed species conservation, the guidelines include appropriate actions to avoid impacts or design compatible grazing prescriptions (seasonal restrictions, adjusted stocking rates, utilization levels, or exclusion). Where such circumstances exist, site-specific measures would be developed to meet conservation goals and those that require specific grazing practices would be included as terms and conditions in the grazing permits.

4.2.6 WILD HORSES and BURROS

The following assumptions, taken from the Rangeland Reform '94 EIS (BLM 1994), were also used in the impact analysis for this EIS.

- Standards and guidelines for managing domestic livestock grazing do not apply directly to managing wild horses and burros.
- Appropriate management levels (AMLs) would be established or changed mainly as a result of site-specific monitoring when dealing with a site-specific issue. For the analysis in the EIS, AMLs would remain constant throughout all alternatives.
- The issue of wild horse and burro overgrazing is not within the scope of this EIS.
- Wild horse and burro populations would be at appropriate management levels within the short term under all alternatives.

Impacts to Wild Horses and Burros

Generally, where livestock grazing is the causative factor for failing to conform with the standards, implementation of the guidelines for livestock grazing will promote progress towards achieving or maintaining healthy soils, functioning riparian areas, proper stream morphology, healthy, productive and diverse native species and clean water. And, as stated in the Rangeland Reform '94 EIS, improved upland and riparian vegetation would result in improved habitat conditions for wild horses and burros where livestock competition has been reduced (BLM 1994).

Impacts to wild horses and burros from implementing the standards and guidelines fall into four categories:

- (1) General positive impacts to wild horse and burro populations resulting from improved rangeland health (as mentioned above);

- (2) Increased potential for gather and removal disturbance of wild horse and burro populations as a result of (1), above;
- (3) Localized potential negative and positive impacts to populations of wild horses and burros resulting from some livestock management actions made by BLM to reach conformance with rangeland health standards; and,
- (4) Increased potential for gather and removal disturbance of wild horse and burro populations, if the gather and removal is determined to be an "appropriate action" if and when it is found that wild horse and burro use is a significant factor preventing conformance with a standard(s) for rangeland health.

Improved rangeland health would positively impact wild horses and burros by providing them with higher quality habitat. This in turn would result in slight improvements in conception, carrying through term, foal survival and longevity. Therefore, we would expect increases in natality, recruitment, and survival, and decreases in mortality.

Wild horse and burro populations would grow more rapidly and, assuming that the AML remains unchanged, be disturbed more frequently by the gather and removal operations needed to maintain the Appropriate Management Level (AML). It is also possible that, over the long term, improved rangeland health would provide a higher level of sustained and reliable forage production, that would result in a determination to increase the Appropriate Management Level for a particular Herd Management Area.

Livestock management actions taken to improve rangeland health would potentially have both positive and negative localized impacts to populations of wild horses and burros. Negative impacts on their free-roaming nature could result if it is determined, for example, that "the appropriate action" is to construct fence(s) to allow for improved livestock management in riparian or upland areas. Such potential impacts should be recognized in the site-specific environmental analysis conducted for such projects and be avoided or mitigated.

Localized positive impacts to wild horses and burros could result from water developments constructed in wild horse and burro Herd Management Areas to allow livestock to graze areas now unused or infrequently used by them, if this is determined to be, or be a part of, "the appropriate action." Where these water developments are located in Herd Management Areas, it is expected that wild horses and burros also will use them.

Cattle and wild horses have significant dietary overlap during all seasons of the year, especially in dry years and during the season when vegetation is dormant (Nat. Acad. Sci. 1980). Some studies, however, have noted very little contemporaneous spatial overlap between horses and cattle (Nat. Acad. Sci. 1980). Yet, BLM field personnel have noted that horses graze in areas both before and after livestock have used the area. For this reason, it is very difficult to quantify and separate impacts of wild horses from those of cattle without concerted, focused study.

However, we do know that there are allotments where use by wild horses and burros is a significant factor contributing to rangelands not conforming with a standard. Depending upon the "total picture" of uses and reasons the land is not conforming with the standard, localized gathers may be initiated where rangeland health standards are not being met and wild horse and/or burro use is the causative factor.

Presently there are no "guidelines for wild horse and burro grazing" although this use, as well as other public land uses, does and will continue to affect the attainment of the standards for rangeland health.

Should wild horse and burro grazing be found to be a causative factor for failing to meet one or more rangeland health standards, the manipulation of wild horse and burro distribution, period or season-of-use within a Herd Management Area currently is not, and is not expected to become, a tool available to the rangeland manager to ensure attainment of the standard. Controlling populations has been and will continue to be the only tool available.

This becomes pertinent in cases where a guideline requires livestock to be moved from a riparian area following early spring use to allow for riparian regrowth during the late spring and summer. In some cases, wild horses and burros will either remain or move into the area and graze it heavily, which could lead to a failure to attain the standard. Should this result in the removal of the wild horses and burros? A similar example is where livestock use is restricted to dormant season use in salt-desert half-shrub ranges, which decline in condition when the vegetation is not dormant or from heavy use at any time of year (Blaisdell and Holmgren 1984). Wild horses and burros cannot be similarly seasonally restricted and may contribute to condition decline in these ranges. Should they then be removed? Scientists recognize this conundrum. In a subsection of Chapter 3 of *Wild and Free Roaming Horses and Burros: Current Knowledge and Recommended Research* entitled "Range-Plant-Community Impacts," which discusses the responses of plant communities to grazing use, it is stated :

The implications of these studies for the management of wild horse ranges are clear. If maintenance of a stable range condition is a desired management objective, control of grazing season may be equally as important as control of animal numbers. This type of control may prove particularly difficult in some areas where options are limited [in the manager's legal authority] to regulating movement patterns and distribution of animals over the range" (Nat. Acad. Sci. 1980).

These types of questions are not covered by the grazing regulations, but create very real concerns about our ability to successfully implement rangeland health standards and guidelines in some areas.

4.2.7 RECREATION

Recreational use of the public lands will continue to grow, with or without implementing rangeland health standards, due to the increasing population pressures within the State, and the marketing of California as a vacation destination.

Implementation of the rangeland health standards and guidelines would have some positive affects upon recreational use of the public lands due to the improved ecological function of those lands, and therefore, the increased recreational opportunities, and the improved aesthetic value of the landscape. These positive affects would be realized under all alternatives, but would likely occur a bit faster under Alternative 4 due to the faster implementation schedule. There would not be a noticeable difference in the rate of increase of recreational use under the different alternatives.

Recreational activities will continue to contribute to environmental degradation, and this would increase in some areas due to increased use. Specific examples are OHV use (including access by hunters and fishermen, not just motorcycles, etc.) and trampling of riparian vegetation by campers and fishermen. Application of the standards of rangeland health, and a set of guidelines, to recreational use would help prevent some of the impacts caused by recreation.

4.2.8 WILDERNESS

Implementation of the Rangeland Health Standards and Guidelines would have both positive and negative affects on wilderness and Wilderness Study Areas (WSAs). The benefits of the standards to the wilderness program will slightly outweigh the negative aspects.

The most substantial benefit would be the improvement of a healthy and naturally functioning ecosystem. Maintaining or improving wildlife habitats through the reduction of livestock and/or through a management system which reduces livestock impacts would allow the area to appear or actually be more natural. Implementation of standards and guidelines would also reduce potential long term management conflicts between the livestock program and the wilderness management program.

The negative aspects to the wilderness program from implementing the Standards and Guidelines would come from the increasing human manipulation of natural systems to resolve past livestock impacts. For example, building additional livestock developments such as water structures and fences increases the number of man-made facilities in the wilderness or WSA. These developments would require the occasional use of motorized or mechanized equipment for maintenance. Both the developments and use of equipment reduce the naturalness of the area and the opportunities for solitude away from human intrusions. Vegetative treatments (e.g., seeding, prescribed fires, ripping) to restore natural vegetation would create temporary visual impacts to the wilderness experience.

The difference in the degree of impact between the alternatives is minor. Even though Alternative Four projects more range developments, the numbers of livestock and the number of acres grazed are potentially reduced. The addition of more developments and the associated long term maintenance needs may create a slightly greater impact to the wilderness or WSAs than the other alternatives, but the improvement of the wilderness ecosystem would likely be more rapid.

4.2.9 CULTURAL RESOURCES

Overall, implementation of the proposed standards or any of the alternatives would have little direct affect upon cultural resources.

Cultural Properties

Reducing cattle numbers and restricting them from riparian and wetland areas (which have the highest cultural site densities) would help protect some sites from damage through trampling or continued erosion. Alternatively, development of more range improvement projects, and fences with the usual development of trails along those fences, would

undoubtedly damage some sites -- although this loss would be lessened or mitigated through the Section 106 process by locating fences and other developments away from sites, and recording the sites and determining National Register eligibility before any projects are constructed.

Traditional Lifeway Values

Native Americans

Most traditional Native American uses of the public lands would not be affected by implementation of the standards and guidelines. However, implementation will result in improvements to upland, riparian, and wetland resources over the long term. If management goals for the vegetative resources are developed in consultation with Native American groups, as outlined in BLM Manual 8161, then there would be some positive benefits through enhancement or encouraged growth of plants traditionally collected for subsistence, medicinal purposes, or crafts.

Ranching Communities

To most ranchers, there will be no impacts to their traditional ranching lifeway through implementation of the grazing standards. In some of the small ranching communities, as explained in the following economic analysis sections, there would be some short term adverse economic impacts to some ranching operations where changes would be made in grazing management to allow the allotments to meet the new standards. In the case of economically marginal operations, this would mean that a rancher might go out of business and give up his traditional lifestyle; or he might join the increasing number of those who have non-ranching jobs to provide a stable income, and ranch part-time, thus continuing his traditional lifestyle to some extent. Whether a person chooses one or the other alternative is dependent upon the availability of jobs in the area, the individual's knowledge and skills, and individual inclination.

Over the long term, improved rangeland health would give greater economic stability to many ranchers, thus enabling them to continue their traditional lifeways. As an example, riparian areas must be healthy and properly functioning to produce water for livestock, domestic use, or fish habitat, and to produce forage for livestock or wildlife. If an area is not healthy, it will not fully support anyone's desired uses or management objectives. However, as areas become more healthy, they can support more uses, and provide greater benefits for the long term.

Of more importance to continuation of the traditional ranching lifeway, and a much greater threat, are the continued pressures of people seeking out the small communities for recreational activities and "country living." The pressures of other uses on the land, as well as the influx of people with different values, and the opportunities for converting rangeland into housing developments is changing the traditional ranching cultures in many communities, and will continue to do so during the next century.

4.3 DIFFERENCES BETWEEN ALTERNATIVES

4.3.1 GRAZING MANAGEMENT

4.3.1.1 Alternative 1, original RAC Recommendations

Implementation of the RAC recommendations would occur on a priority basis as described in Chapter 2 and within BLM's current staffing and funding levels, with full implementation predicted to be completed within 15 years. The actual improvement or recovery would extend beyond that timeframe in some areas, depending upon climate, topography, and physical potential of the site.

Of the 459 allotments assessed in the EIS area, 59 of these allotments do not meet one or more of the standards due to current or recent grazing practices. Most would require changes in livestock grazing management or grazing related activities; however, changes have already been implemented on some of these allotments. Note that since the preparation of the draft EIS, a more refined assessment has been made of the allotments in relation to meeting the fundamentals of rangeland health. Evaluations are currently underway to determine the specific changes in management required for each allotment to meet the fallback standards as identified for Alternative 3. This information is not yet available for this assessment. The management changes projected in the draft EIS were based on broad assumptions from past experiences by the field offices and were not based on specific needs as determined through detailed evaluations. Since detailed information is currently not available to use for analysis, the same projected information from the draft EIS will be used for this analysis, except the numbers will be 28% less, based upon the proportional decrease (28%) in the number of allotments now determined to need management changes (see Chapter 3, Section 3.2.1).

Thirty five of the 59 allotments requiring change are located within the Great Basin Floristic Province and contain a relatively large acreage of public rangeland. The allotments requiring change in the annual grassland area typically have less public land and would require comparatively fewer adjustments (such as an adjustment in utilization level or season of use).

Adjustments in the amount of grazing use (through changes in utilization levels, season of use, exclusion, etc.) would result in a reduction of 11,712 AUMS within 1-5 years, and extending through a good portion of the implementation period. Some sustainable grazing capacity is predicted to recover as vegetative conditions improve, with a corresponding reinstatement of some AUMs. As a result of the management changes, there may also be an increase in potential sustainable grazing capacity above current levels of authorized grazing use on some allotments. Actual determinations of how many AUMs would be reinstated or additional AUMs authorized as a result of improvement would be determined through the monitoring of rangeland health conditions. Portions of some of the grazing allotments that are currently grazed could be excluded from grazing use entirely or at least until rangeland health conditions in those areas are fully restored.

Changes in grazing systems would vary relative to the particular need for restoring rangeland health on a particular allotment. These systems may include prescriptive systems based on calendar dates or based upon vegetative conditions, such as range readiness, utilization levels, plant growth conditions, etc. Rotating grazing at different times or seasons on specific

areas within an allotment is often effective. For some allotments, a minor modification of the existing grazing system may be all that is necessary.

Changes in the current season of use that an allotment or a portion of an allotment is grazed may be needed to help rangeland health recovery. Proposed changes in class of livestock, most involving changing the use from cattle to sheep, would better enhance the recovery of riparian areas or areas where managing the current class of livestock to meet rangeland health goals is not achievable.

Herding livestock, particularly in allotments with areas sensitive to grazing, such as riparian areas or habitats of endangered species, is considered to be a viable management measure for 26 allotments. It is predicted that this may require up to 89 additional workmonth equivalents in labor for the permittees or lessees.

Table 4.3.1: ESTIMATED MANAGEMENT CHANGES -- PROPOSED ACTION	
No. of Allot.*	Type of Change
34	Reductions in livestock use -- within 1-5 years, extending until recovery or improvement
25	Areas excluded from livestock use ¹
24	Changes in grazing system
19	Changes in season of use
8	Changes in class of livestock
27	Livestock herding needed
35	Water developments needed
36	Fencing needed
23	Vegetative treatments needed
16	Weed control needed

* Many of the allotments may require more than one type of change.

(1) Some areas within some of the existing allotments may no longer be available for grazing, but not the entire allotment would be excluded.

In order to successfully implement many of the necessary management changes, as well as to further facilitate the enhancement of the health of vegetative communities, the range improvement projects identified in Table 4.3.1 and Table 4.3.1(a) will need to be in place and/or implemented at an estimated cost of over \$1.5 million.

TABLE 4.3.1 (a): ESTIMATED AMOUNT and COSTS of RANGE IMPROVEMENT PROJECTS

Amount and Type of Activity	Costs
8,000 acres of vegetative treatment	\$ 424,000
5,000 acres of weed control	286,000
127 livestock watering facilities	322,000
178 miles of fencing	534,000
Total	\$ 1,566,000

Vegetative treatment projects would convert existing vegetative communities to a more desirable type generally through the use of prescribed fire, mechanical removal, and/or reseeding. Weed control would be done using an integrated management approach which could include the use of herbicides, mechanical removal, prescribed burning, or the use of biological control agents. The additional watering facilities and fencing would help re-distribute livestock use from existing heavily used areas or to help control livestock grazing use within specific areas or during specific seasons.

4.3.1.2 Alternative 2 -- State-wide Consistency/Consolidated Standards and Guidelines

The impacts of this alternative are the same as for Alternative 1.

4.3.1.3 Alternative 3 -- No Action (Fall-Back Standards and Guidelines)

The impacts of this alternative are the same as for the proposed action alternative, Alternative 1, given the following assumption.

The Fallback Guidelines numbers 7, 9, 11 and 12 raise some questions of original intent and consistency with the other alternatives. This becomes particularly critical when considering the future management of California's annual grasslands. It is assumed for the purposes of this analysis that fallback Guideline Number 15 was designed to provide an exception to the above guidelines for designated annual grassland in California as well as designated ephemeral rangelands which are common in desert areas outside of the EIS area. The key concerns regard the enhancement and management of native species and the concern for season-long grazing. Guideline 15 then provides for sustaining healthy rangeland conditions within the management parameters identified for these type of rangelands.

4.3.1.4 Alternative 4 -- Rapid Improvement/Rapid Recovery Alternative

Under this alternative implementation would occur on a priority basis as described in Chapter 2; however, the rate of implementation would be accelerated beyond that of the other alternatives and beyond the capability of BLM's current staffing and funding levels. Most of the needed changes would be fully implemented within 5 years. Also, because of the need to enhance rangeland health conditions at this accelerated pace, some management changes

would be applied differently and with a less incremental approach than might be done for the other alternatives.

Adjustments in the amount of grazing use would result in a reduction of 25,849 AUMS within 1-5 years. This increase in loss of AUMs over the other alternatives is a result of implementing more restrictive utilization levels, excluding more areas from grazing use, and implementing other measures that would accelerate rangeland health recovery much faster than the other alternatives. Portions of allotments, consisting of a total of 67,869 acres, would be excluded from grazing use.

The types of changes in grazing management measures would be the same as for those in the proposed action, but the frequency at which the actions would be applied would increase and there would be an increase in the number and types of actions implemented on some allotments. The increase in the rate of application and intensity of management would be necessary in order to restore rangeland health in this accelerated time-frame. As compared to the proposed action alternative, adjustments in the amount of livestock use would affect 11 additional allotments for short term reductions. There would be an additional 58,000 acres of areas excluded from grazing, at least on a temporary basis. Compared to the other alternatives, grazing management changes would be applied to an additional number of allotments as follows: grazing systems for 10 allotments, changes in season of use for 12 allotments and 7 more allotments would require herding techniques requiring an estimated total of 160 workmonth equivalents of labor to conduct the herding. There would be no change in the number of allotments needing a change in class of livestock. The increase in the numbers of allotments affected is primarily due to allotments where some actions have already been implemented and improvements are occurring (no need for action under Alternatives 1, 2, 3 and 5), but different actions would be applied under this alternative to result in more rapid improvement or recovery.

Table 4.3.1(b): ESTIMATED MANAGEMENT CHANGES -- ALTERNATIVE 4	
No. of Allot.*	Type of Change
45	Reductions in livestock use -- within 5 years, extending until recovery or improvement
27	Areas excluded from livestock use ¹
44	Changes in grazing system
31	Changes in season of use
8	Changes in class of livestock
34	Livestock herding needed
23	Water developments needed
38	Fencing needed
23	Vegetative treatments needed
19	Weed control needed

* Many of the allotments may require more than one type of change.

(1) Areas within existing allotments would no longer be available for grazing, but not the entire allotment would be excluded.

The types of range improvement projects, as identified in Table 4.3.1(b) and Table 4.3.1(c), needed to facilitate the accelerated rate of improvement of vegetative conditions are the same as for the proposed action, however the amount of additional projects and areas affected would be greater resulting in an additional 16,000 acres of vegetative treatment, 2,200 acres of weed control, 17 more watering facilities, while the total miles of fencing needed is almost the same. The total costs predicted for implementing the projects would be approximately \$1 million more than for the proposed action.

TABLE 4.3.1(c): ESTIMATED AMOUNT and COSTS of RANGE IMPROVEMENT PROJECTS	
Amount and Type of Activity	Costs
24,000 acres of vegetative treatment	\$ 1,272,000
7,200 acres of weed control	410,000
144 livestock watering facilities	365,000
180 miles of fencing	540,000
Total	\$ 2,587,000

In order to implement the needed management actions for this alternative, additional BLM staffing and funding would be required to meet the time frame objectives. As this alternative requires greatly accelerating assessments, evaluations, management determinations and range improvement projects, an estimated increase of 18 full-time equivalent personal with an additional \$180,000 per year for operating expenses over current levels for implementation would be required. These additional costs would be required for the first five years of implementation; thereafter a return to current levels of staffing for ongoing monitoring and administration may be appropriate.

Some sustainable grazing capacity is predicted to recover as vegetative conditions improve, with a corresponding reinstatement of some AUMs. As a result of the management changes, there may also be an increase in potential sustainable grazing capacity above current levels of authorized grazing use on some allotments. Actual determinations of how many AUMs would be reinstated or additional AUMs authorized or exclosures opened, and where and when this would occur, have not been made, and would depend upon the actual on-the-ground improvements in rangeland health following implementation of management changes. These changes are expected to occur much more rapidly under this alternative than under Alternatives 1, 2, 3 and 5.

4.3.1.5 Alternative 5 -- Preferred Alternative

The major differences between the preferred alternative and the other alternatives focus on water quality and grazing utilization levels. This alternative provides consistent standards and guidelines for the three RAC areas for water quality and references to the application of the proposed best management practices (BMPs) identified in Appendices 9 and 10. Adherence to meeting the water quality standards and applying the guidelines, including the BMPs, should not result in any difference in consequences between the alternatives to grazing operations. Adherence in meeting state water quality standards and using approved BMPs is a policy requirement with or without its identity in the developed rangeland health standards and guidelines, and would therefore be applied regardless. The consequences of

implementing this alternative, therefore, would be no different than implementing any of the alternatives regarding water quality protection.

Specific grazing utilization level guidelines were added or modified in this alternative to each of the three RAC's set of guidelines. Except for Alternative 3, which is silent regarding specific utilization levels, the modified language of the utilization guidelines in this alternative will result in little or no change in implementation for the Bakersfield RAC area, since the criteria in the guideline are essentially the same. For the Ukiah RAC area, the guideline would add maximum utilization levels for perennial ranges. At the present time, however, there are no allotments within the Ukiah RAC area currently requiring perennial range management objectives. Additionally, the guidelines add specific utilization levels for riparian areas in the Ukiah RAC area and browse limits for both RAC areas, but any impacts from these added requirements to current grazing use are unknown at this time. For both of these RAC areas, the modifications mainly serve to further explain the application of use levels. The guideline also provides consistency for all annual grassland ranges regarding residual dry matter (RDM) levels throughout the EIS area.

This alternative abolishes Guideline 14 for the Susanville RAC area (still in Alternatives 1 and 2), and replaces it with the above discussed guideline for utilization levels. Guideline 14 in Alternatives 1 and 2, although more liberal on use levels for perennial herbaceous vegetation, would be applicable to all allotments until site specific use levels could be determined on an allotment-by-allotment basis. This would require the immediate application of utilization standards and guidelines for all allotments upon approval of the standards and guidelines. The replacement guideline (Susanville Guideline 16) in Alternative 5 requires the utilization levels to be applicable only in cases where one or more standards is not being met, where significant progress is not being made toward meeting the standards, where livestock grazing is the cause, and where use of the utilization guidelines would be expected to enable the area to meet the standards. Although the adjusted maximum utilization levels that may be applied to allotments (or parts thereof) are quite conservative in comparison to Guideline No. 14 in Alternative 1 and 2 (25-40% in Alternative 5 compared to 50-60% in Alternatives 1 and 2), the number of allotments anticipated to be affected by this modified guideline is substantially lower. For example, there are 22 allotments currently needing management changes in order to meet one or more of the fundamentals of rangeland health in the Susanville RAC area that would be subject to this guideline. It is anticipated that the current utilization levels for some of these allotments, however, may not trigger the need to apply this guideline at all, while in other allotments the application will be limited to only certain key areas. Most utilization adjustments that are applied could be accomplished through management changes such as season of use, fencing, herding, and other practices, including AUM adjustments.

The consequences of this alternative, other than discussed above, would be the same as Alternative 1.

4.3.2 UPLANDS

4.3.2.1 Soils

The major difference between the alternatives is that under Alternative 1, the Standards and Guidelines developed for the Susanville RAC area do not address plant litter. Under this

alternative the measure chosen to gauge soil health is erosion. Erosion is a symptom of a system out of equilibrium, often due to a change in natural soil cover, soil intake rates (compaction) or the natural drainage pattern (roads). A change in soil cover resulting from fire or grazing may leave the soil unprotected from natural erosive forces of wind or water. In this example, erosion is the symptom and the cause is reduced soil cover. If management monitors erosion, then damage to the resources has already occurred; however, if the potential cause of the resource degradation is monitored and managed before damage occurs, then prevention is possible.

This oversight has been corrected in Alternative 5 by addressing litter in the soil standard for the Susanville RAC area.

4.3.3 RIPARIAN-WETLANDS and STREAM CHANNELS

4.3.3.1 Water Quality

Under all alternatives, as explained in Section 4.2.3.3, we would see a general enhancement and improvement in riparian and wetland conditions. This improvement would be reflected in hydrologic function and water quality. This would be a similar improvement under all alternatives, but potentially more rapidly under Alternative 4.

Managing for the enhancement of water quality and meeting State water quality standards are a matter of BLM policy, as well as being mandated by the Clean Water Act and other authorities. BLM will comply with the direction in the regulations regardless of how they are identified in the standards and guidelines.

Although the standards and many of the guidelines either address or are supportive of enhancing water quality, there are some differences between the alternatives as well as some deficiencies that could result in BLM missing opportunities to improve water quality in some cases. An evaluation of the adequacy of the Standards and Guidelines in addressing water quality concerns is contained in Appendix 16. The potential impacts of those differences is discussed below.

Alternative 1

The Bakersfield and Ukiah RACs specifically address meeting state water quality standards. However, the Ukiah water quality standard provides for an exception to meeting state standards for off-stream artificial impoundments. This is contrary to the State's requirements and therefore cannot be implemented by BLM. The Susanville standard and description does not address meeting state standards, and focuses instead on meeting "desired" beneficial uses.

While some of the guidelines specifically address water quality concerns or support management measures that indirectly protect water quality, lack of some more specific guidelines such as hardening water gaps or water crossings, and measures minimizing livestock concentrations in riparian areas could result in overlooking opportunities to improve water quality.

Alternative 2

This standard does not address meeting state water quality standards; rather, it focuses on working with the State of California and the Regional Boards to revisit the Basin Plans and make new determinations of the beneficial uses. The intent is that BLM and the State of California would jointly determine what the new standards would be.

As the guidelines for this alternative are the same as for Alternative 1, the potential impacts would be the same.

Alternative 3

Neither the standards or guidelines specifically address water quality. The fallback standards, by not including water quality, are inconsistent with the requirements of the regulations and the identified fundamentals of rangeland health.

Some of the fallback guidelines do support protection of water quality values as identified for other purposes (Guidelines 3, 4, 12 and 13). Again, there is some risk that if guidelines do not specifically provide for grazing management actions that enhance water quality, then some impacts would occur due to oversight.

Alternative 4

The standard in this alternative specifically states that BLM will meet state water quality requirements. There is a specific guideline that states that when making management changes or adjustments, we would do them in a manner that would maintain or enhance water quality to meet identified management objectives. Guideline 1 also uses specific examples of management practices that could maintain or enhance water quality. However, there are no specific guidelines for minimizing livestock concentration at or near water sources, thereby increasing the possibility that opportunities to improve water quality would be overlooked.

Alternative 5

The preferred alternative provides consistent language in the standards and guidelines, referring to meeting the standards of both states (appropriate to the specific RAC area) and referencing a set of proposed best management practices (BMPs) for grazing. Additionally this alternative clears up some confusion identified in some of the other alternatives regarding meeting drinking water standards at livestock watering facilities. This alternative provides improved consistency and clarity over the other alternatives and provides adequate emphasis for the protection of water quality from livestock grazing activities.

The proposed Grazing Management Practices for Water Quality and BMPs in Appendices 9 and 10 provide a list of types of management measures and prescriptions to include for protecting water sources and water bodies from nonpoint sources of pollution that may occur from livestock grazing activities. Most of the practices are either consistent with or a refinement of the standards and guidelines provided in Alternative 5 or the other alternatives. Included are some management measures that are not directly applicable to authorized livestock grazing use such as the management of wild horses and burros and the installation of holding facilities. However, these inclusions would logically be placed with the grazing

element in the overall water quality management plan which is to include BMPs for all public land activities. The prioritization of water quality management objectives for application in California (Appendix 10) is consistent with BLM policy.

4.3.4 ECONOMICS

The economic impact analysis is based on assessments by the 10 California BLM Field Offices of how implementation of the Standards and Guidelines would affect their rangeland management program. Central to their assessment is how livestock AUM levels might be affected and potential changes in permittee operation expenses. The following economic analysis is different in significant ways from that in the Draft Environmental Impact Statement [DEIS].

The initial assessment of how livestock operations in the EIS study area might be impacted was carried out from November 1996 through April 1997. Since that time, additional field data has been collected and analyzed and further grazing management options have been developed in a number of allotments. As a result of these developments, a number of changes in the grazing impact assessment have occurred which affect the economic impact analysis. The key changes include: the projected total number of allotments requiring a reduction of AUMs has decreased from 82 to 59; the increase in field data has reduced the number of allotments with insufficient information to assess grazing impacts; the projected BLM Range Program cost has decreased and the number of work months required by permittees for herding has also decreased.

For this final impact assessment, an overall 28% decrease in AUM reductions has been projected by the California BLM grazing program. This percentage has been used to adjust the economic impact analysis for the total EIS study area. The county, allotment and permit specific AUM change impact assessment used for the economic analysis in the DEIS is no longer valid. Corresponding complete and updated projections are not available and as a consequence a county, allotment and permit specific analysis is not possible. Some of the general observations and conclusions in the DEIS are still applicable and will be discussed in the local impacts section.

It should be remembered that the grazing impacts estimated by the field offices were conducted in a very different manner than the methods used in actual allotment permit management. The present grazing impact analysis involves some data, some professional judgment and the application of assumptions and estimates in order to make any impact assessment possible. The analysis is not based on a thorough evaluation of complete up-to-date range inventory data for each allotment and permit. The impact statistics, therefore, represent only a probable scenario and not necessarily the actual outcome of implementing rangeland health standards and guidelines.

4.3.4.1 EIS Study Area Impact Analysis

Income and Employment Impacts

The grazing impact analyses from each of the ten BLM Field Offices in the EIS study area were summarized and the potential AUM changes totaled. Implementation of the standards and guidelines under Alternatives 1, 2, 3, and 5 could result in a reduction of 11,712 AUM's

within the next five years (Shown in table 4.3.4.1 below). This reduction would be expected to continue through most of the implementation phase and until improvement or recovery occurs. If this AUM change were to occur, total direct income in the EIS area could be reduced by \$602,940 plus a loss of 6 jobs over the next 5 years. The comparable short term AUM change for Alternative Four was a reduction of 25,849 AUMs with a potential total income loss of \$ 1,322,935 and a decrease of 12 jobs over the entire EIS study area. These numbers do not represent a significant impact in the context of California's huge agricultural income and employment, or even in the 1.5 billion dollar California livestock industry. The new projected income loss of \$602,940 represents 0.04 percent of the \$1.5 billion in California livestock sales in the 1992 baseline year.

Table 4.3.4.1: EIS Area Economic Impacts on Total Income and Employment by Alternative			
Alternative	Short Term Net Change in AUM's	Total Income Change (\$)	Total Employment Change
1, 2, 3, 5	- 11,712	- 602,940	- 6
4	- 25,849	-1,322,935	- 12

The possible reductions of 11,712 AUMs represents 3.4% of the total active preference of 340,499. It should be noted that non-use in FY 96 totaled 109,962 AUM's, meaning that livestock operators actually grazed only 67.7 percent of what BLM would permit them. The 32.3% non-use results from a number of potential individual and national reasons. Individual reasons include personal circumstances of the operator, e.g. illness or operation needs. Non-use also results from industry conditions such as poor national livestock prices. For example, in Modoc County, from 1992 to 1996 the county livestock inventory dropped 8,000 animals representing a 15 percent drop. During that time, the average sale price for steers and heifers dropped 21.5 percent. The 3.4 percent potential AUM reduction is roughly one-tenth of the authorized AUMs which permittees have decided not to actually use for various reasons. The non-use cannot be utilized to offset the potential AUM reductions because different allotments and pastures are involved and present laws do not allow flexibility in permit grazing location.

Grazing Fee Revenue Sharing

Grazing fee receipts are variously distributed to the state/counties' range improvement fund and the federal treasury, with the proportion depending upon whether the AUM's involved fall within Section 3 or Section 15 administrative units (see Glossary for definition). A reduction of AUMs would reduce grazing fee revenue. In Alternatives 1, 2, 3 and 5, a reduction of 11,712 AUMs within the next five years would decrease grazing fee receipts an estimated \$15,811 at the 1997 fee level of \$1.35 per AUM. It is estimated that 95 percent of the potential AUM reduction will fall in Section 3 allotments. Accordingly, receipts would be reduced as follows: states/counties \$2,277, range improvement fund \$7,906, and the federal treasury \$5,629.

In Alternative 4, a reduction of 25,849 AUMs within the next five years would decrease grazing fee receipts an estimated \$34,911 at the 1997 fee level of \$1.35 per AUM. Grazing fee

revenue sharing would be reduced as follows: state/counties \$5,027, range improvement fund \$17,456, and the federal treasury \$12,429.

The projected state/county grazing fee revenue sharing decreases would not be significant for counties. The decreases to the counties of \$2,277 and \$5,027 represent only 1.1 and 2.4 percent of the 1996 state/county fee revenue sharing of approximately \$203,000. PILT payments would not be affected by implementation of the rangeland health standards, and PILT is a much more important source of revenues to county governments. The total grazing fee revenue shared throughout California represents only 1.8 percent of the \$10,981,192 state-wide PILT payments.

Table 4.3.4.1 (a): EIS Area Economic Impacts on Grazing Fee Sharing by Alternative		
Alternative	Net Change in AUM's	Total Fee Sharing Change
1, 2, 3, 5	-11,712	-\$15,811
4	-25,849	-\$34,911

Possessory Interest Tax

The state of California has an assessment on grazing permits called the Possessory Interest Tax. Grazing permits are seen as the private right to the possession and use of publicly-owned property which has value. The tax is assessed on AUM value as calculated by each county. In Modoc County, the assessed value has four components: permit sale value, cost per AUM, a capitalization rate and the anticipated term of possession. In 1996, assessed value was calculated at \$30 per AUM permit value, plus \$1.35/AUM x a 10% capitalization rate x 10 years term of possession. Because the revenue from the tax on BLM grazing permits is not separately recorded by the counties, it is not possible to state the total amount collected in 1996. The assessed value of an AUM varies from county to county but an average value of \$30 will be used for the present analysis. Because Nevada does not have this tax, the AUM reductions in Nevada are removed from these calculations. The 28 percent overall adjustment produces a reduction in possessory interest tax revenues of \$2,339 under Alternatives 1, 2, 3 and 5 and \$5,537 under Alternative 4.

Permit and Real Estate Values: EIS Area

As noted in Chapter Three, the assessed value of an AUM in a permit, times the number of AUMs allowed, adds to the sales value and taxable value of a ranching operation. If permit value is assessed at \$30 an AUM, then a permit with 500 AUMs is valued at \$15,000. The value of a BLM grazing permit to the total value of a ranch base property varies from region to region in the West in response to a number of variables, including real estate market forces. County Assessors in California report that in the last ten years, there has been roughly a twenty percent decline in permit value assessments because of changes in, and increasing uncertainty about, federal grazing permits. While a continuing decline in permit value is possible, the empirical research does not support making a percentage decline in value assumption and the following analysis uses a constant \$30/AUM figure.

Land values in California vary from region to region with values higher along the coast and in the central valley. Prices are lower, in general, in the northeastern part of the state. A 2,000 acre ranch at the California statewide average price of \$2,215 per acre would be worth \$4,430,000. A 2000 acre ranch at one-third the statewide average, or \$738 an acre, would be worth \$1,476,000. Using a permit value figure of \$30 per AUM, a 500 AUM permit would be worth \$15,000 and 1000 AUM permit would be worth \$30,000. At the lower land value, the permit values represent only 1 to 2 percent of the total ranch sale value. At the higher land value the permits represent .5 and 1 percent of total ranch value. In California and Nevada, rural land prices have increased an average of 3 percent a year over the last decade. Therefore the land value increase in one year could exceed the total value of the grazing permit to the sale price of the ranch. An even lower per acre value will be used in the following local impact section, but the outcome remains the same. In conclusion, the projected reductions in AUMS will not significantly affect the base property of permits.

Additional Permittee/Lessee Expenses

In addition to the decrease in livestock operator income and permit value, some permittees would have other expenses. In some allotments, it was proposed that herding of livestock would be a part of implementing the Standards and Guidelines. In Alternatives 1, 2, 3, and 5, the need for 89 herding work months was projected for 26 allotments. Using average wage rates for livestock/field workers published in the Nevada 1996 Agricultural Statistics report, the total herding expense was calculated at \$79,995, which, if evenly utilized in all 26 allotments, produced an additional expense of \$3,077 per allotment per season. In Alternative 4, the need for 160 work months in 33 allotments results in an additional total expense of \$143,360. Dividing the total cost evenly among all allotments results in an additional expense of \$4,344 per allotment per season.

BLM Range Management Program Cost Impacts.

In the EIS public scoping process the question was raised of how much it would cost BLM to implement the Standards and Guidelines. Rangeland program expenditures include staffing, field work, and construction and some maintenance of range facilities such as fences and water developments. Program tasks include field inventory, data assessment and incorporation into AMPs and permits, permit administration, and ongoing rangeland monitoring and continuing grazing adjustment as needed.

The BLM Washington Office instructed the field offices to plan for implementation of the Standards and Guidelines within existing staffing and budget levels. As a result, as seen in the following table, there are no projected BLM program fiscal impacts for Alternatives 1, 2, 3 and 5.

The agency budget constraint did not apply to Alternative 4 and the field offices estimated that implementation would require an additional \$1.47 million a year for at least the first five years for the rangeland management program.

Table 4.3.4.1 (c): EIS Area BLM Range Program Annual Fiscal Impacts

	Alts. 1, 2, 3 & 5 Present Budget	Alts. 1, 2, 3 & 5 % Annual Increase Over Present Budget	Alt. 4: Annual Increased Costs (over present budget) over 5 years	Alt. 4 % Annual Increase Over Present Budget
Personnel	\$ 998,627	0 %	+ \$ 775,800	78 %
Operations	\$ 330,174	0 %	+ \$ 180,000	55 %
Range Projects*	\$ 250,000	0 %	+ \$ 517,400	207 %**
Total	\$ 1,578,801	0 %	+ \$ 1,473,200	93 %

* Only BLM funds (8100) are noted here. No assumptions are made for allocations of grazing fee revenues returned to the state/counties.

** It is assumed that all of the existing CA BLM funds for range projects will be allocated to project needs. Therefore, only the amount over the existing budget is considered an increase.

Absentee Permittees and Grazing Program Impacts

The economic viability of livestock ranches and local communities is an important issue in the rural Intermountain West. Often missing in the discussion is the fact that the economic impact of the livestock industry is complicated by the split ownership structure of grazing permits, permit base ranch locations and permit owner residence location. When a BLM grazing permit is owned by a permittee who lives outside the local area there is some affect on the location of revenues and expenditures. Income from livestock sales provides income for both the local ranch workers and the permit owner. Livestock operation expenditures are also affected. Expenditures such as travel, insurance, office expenses, financial services, and the increased possibility of non-local purchases for operations, spread the economic impact of livestock operations between the allotment location county and other locations.

Research on the grazing program in one of the Field Offices in the present analysis illustrates the point. Twenty percent of the operators were absentee permittees/lessees, i.e. did not live in the same county as the allotment, nor did they live close enough to use any local community as their primary source of supplies. These permittees held forty percent of the AUM's in the county administered by that BLM office. Furthermore, some of the operators leased from an absentee permit owner, and that absentee permittee is not included in the statistics above but implies a further dispersion of economic impact.

To varying degrees, the dispersion of economic impacts is common. An examination of grazing permits in three other California Field Offices found that 17, 52 and 53 percent of those who held permits and leases lived in a different county than their allotment and outside the local market area.

Another aspect of grazing impacts involve local governments. The government fiscal situation is also complicated by the geographical split of allotment and operator location. In the same Field Office grazing program examined in detail above, 78 percent of all livestock operators lived in a different county than their allotment location. But PILT payments to counties,

grazing fee revenue sharing and California's Possessory Interest Taxes are directed to the allotment location county. In this example, 78 percent of the BLM grazing program local government fiscal benefits do not go to the county where the livestock operator lives.

The economic implication of these facts is that some percentage of the direct and indirect income impacts (e.g., profits, taxes and purchases) is distributed beyond the local and regional economy. While the present analysis was able to partly incorporate this fact (e.g. the possessory interest tax analysis) the affect of non-local permit holders has not been fully incorporated in the analysis.

4.3.4.2 Potential Local Impacts

In the DEIS, the 14,001 AUM reductions in Washoe County, Nevada and Lassen County, California represented 87.7 % of all the projected reductions in the EIS study area. In this final document, the BLM grazing program now projects that implementation of the proposed Standards and Guides could result in a total reduction of 11,712 in the next five years. If the Washoe/Lassen proportion of AUM reductions were to remain, the 14,001 AUMS decreases to 10,271 AUMS. Such a decrease would be reflected in all the economic impact variables analyzed in the DEIS, i.e.: income change, employment change, Grazing Fee revenue sharing and Possessory Interest Tax.

The DEIS concluded that there would be insignificant impacts to local county governments and economies and that conclusion remains. Modoc County provides a good example. The majority of the estimated AUM reductions in Washoe County would impact permits held by ranchers in Modoc County. (Although it should be noted that a sizeable number of the permit AUMS are held by individuals who live in Reno or outside the three county region.) But if the AUM reductions resulted in a drop in sales of \$500,000, that figure represents only 0.8% of the total 1995 Modoc County agricultural sales of \$64 million and 0.3% of the total county income of \$150.7 million.

It also cannot be assumed that future total county income from livestock sales would be lower than present because of possible AUM reductions in the affected permits. The DEIS noted the significant impact of changing cattle prices on local economies. From 1992 to 1995, the livestock operators of Modoc County experienced a 58.8% drop in their livestock income because of lower prices and livestock inventory. This represented \$15,881,000 a year! Future increases in cattle prices could offset the limited AUM reductions. In addition, because of the large amount of non-use of federal grazing permits (32.3%), the potential exists for a significant increase in the livestock inventory and subsequent sales.

Although the percentages of AUMS, livestock operators and permits affected by the impact projections are small, the potential exists for some individual livestock operators to be significantly impacted.

How a permanent reduction in AUMS in the three county region area might impact individual livestock operations is affected by a number of basic factors, including: percentage dependency of the operation on federal land forage, the amount of operation debt, the diversity of income for the owners, efficiency of operation, the cost and availability of alternative forage, livestock prices and the increase of land values. Undeveloped land in the rural west is expected to rise in value in response to the increasing demand for land for residential development. For example, in Washoe County, the statistically average ranch is

2,270 acres with an average value of \$289 per acre for a total value of \$656,000. If land values continue in the next ten years as they did in the last ten years, the value of that average ranch will increase by \$209,930 to a total value of \$865,930. In other words, change in real estate values over the next ten years will be a significant factor in ranching economics and will likely be far more significant than AUM changes.

The complexity of the ranching economics situation makes it impossible to predict the outcome of AUM changes on an individual livestock operation with any degree of certainty. Accordingly, the AUM reduction estimates and the following discussion represent only one scenario.

The research on the affect of AUM reductions on herd size has found that there is not a one-to-one ratio. Because of flexibility in operation and/or availability of alternative forage, the decrease in herd size is, in varying degrees, less than the proportional decrease in AUMS. The present analysis uses a model based on a sample of ranches in all of the western states including operations in Northern California. The model predicts that herd size reductions will vary by percentage of AUM reduction and percentage of dependency on federal forage. If all of a livestock operation's animals were on federal land for five months of a year, for example, that operation would have a 42 percent federal forage dependency.

The analytical model projects that a 15 percent AUM reduction could result in a ten percent revenue loss on that permit. For example, an operation with \$50,000 in livestock sales could experience a ten percent loss in ranch income if alternative forage was not available. A ten percent reduction could be difficult but potentially not critical for continued ranch operation. Permits experiencing a 30 percent reduction could experience a 17 to 20 percent livestock income loss on this permit. In these times of low cattle prices, if this permit is the only source of ranch income, it is possible that only the operations with the best of fiscal and operation conditions listed above could continue. For permits in the highest AUM reduction category, if this permit is their only source of a single ranch income, continued operation is in doubt. The exception to this worst case scenario would be if the permit in question is only a small part of a larger unaffected operation, or the owners have a large land equity upon which they can borrow and a plan for future ranch income diversification, or they have outside income.

4.4 CUMULATIVE IMPACTS

The regulations for implementing the National Environmental Policy Act (NEPA) require federal agencies to analyze and disclose cumulative effects -- effects that result from the incremental impact of an action "when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR 1508.7)

Demographics and Change

Much of the information in this section is taken from California Fish & Wildlife 2000 (BLM 1989).

Over the last century, California has experienced more rapid population and economic growth than any other developed area in the world. While the population of the United States grew

6.5 fold between 1860 and 1984, California's increased 66 fold, and it has grown by over 7 million just since 1988. California is the nation's most populous state and a world leader in economic, social, and technological change. Over the next 10 years, California's population growth is expected to increase at nearly twice the national rate.

Since the turn of the century, California's population has been largely urban-based, and rural growth was extremely slow. However, the 1970's witnessed a dramatic change in rural growth rates. From 1980 to 1987, 23 rural counties experienced population increases averaging nearly 24%. This trend is expected to continue into the next century.

Urban and rural growth trends will have an increased, powerful influence on resource management policies. Demands for urban and industrial growth will increasingly result in pressure over resource uses and tradeoffs in resource management. Such pressures will be most crucial at the urban-rural interface, where much of California's growth is now occurring.

As urban growth encroaches upon the public and private rural lands, the demands for timber, fuelwood, forage, minerals, recreation, and consumptive and non-consumptive uses of fish and wildlife will assume greater importance.

Projecting agricultural trends in California is difficult. Agriculture may increase or decline depending upon a variety of factors, including international commodities markets, technological advances, and the cost of water. Population growth may stimulate an increase in agricultural production or simply result in fewer exports of agricultural products. An increase in agricultural production would be limited by the acreage of suitable land open to such development. Much of the arable land in California is already in production.

Trends in forage use are easier to predict. Rising costs for livestock production and decreasing demand for beef will tend to decrease the demand for forage on private lands. Instead, a trend to diversify the use of private rangelands will develop, and the demand for living space will increase, resulting in greater conversion of rangelands to urban areas. Forage use on public lands is expected to be somewhat different than on private lands. On public lands, AUMs for cattle and sheep will remain fairly constant or decline only slightly. The traditional problems associated with allocating forage for livestock as well as wildlife will intensify as wildlife habitats elsewhere are reduced and fragmented. Competition between livestock and wildlife for forage will increase.

California is projected to experience the most rapid increases in demand for outdoor recreation of any region of the country well into the next century. Recreation is already the second largest segment of the economy in the western United States; however, the CA Trade and Commerce Agency predicts that travel and tourism *in California* will be **the world's number one economy** by the year 2000 (Poimiroo 1997). Demand for developed recreation sites such as picnic areas, campgrounds, and cabins in scenic areas will increase as the average age of the population increases. As young urban professionals begin raising families, demand for recreational opportunities closer to home will also increase.

While the demand for outdoor recreation is increasing, meeting this demand is becoming increasingly difficult. More and more people are crowding into existing recreation areas because the development of such areas is not keeping pace with demand. Many state and national parks now require reservations for camping and limit the length of stay. Yet, increasing austerity programs in the Federal and State budgets and decreasing staffs are

forcing more and more reliance on volunteers for campground and trail maintenance. Although private lands represent a potentially significant source of outdoor recreation opportunities, problems associated with access and liability will hinder development of recreational facilities. Meanwhile, Federal lands will be forced to absorb the demand until such developments occur.

Inter-relationships

Maintaining the health of the public lands is critical in continuing to provide all of those things that the public expects and demands. Maintaining a healthy, viable, and diverse economy in the rural areas and communities surrounding the public lands is as important to public land management as maintaining a healthy, viable, and diverse ecosystem -- and the latter may well depend upon the first.

The reality is that public lands are inextricably intertwined with private lands throughout the West. There are tremendous pressures on the private rangelands to be sold and developed for rural housing. These private lands often contain the primary water sources for wildlife (game and non-game species, migratory birds, special status species, etc.), livestock, and wild horses and burros. Habitats and migration routes, water quality, recreation and tourism, are all dependent upon, and affected by changes, in the West's farm and ranch situation. Maintenance of these private rangelands in their current status should be a prime consideration to all of those interested in maintaining healthy ecosystems.

Other agencies such as the Forest Service are facing the same pressures and direction to manage their lands. The Forest Service is currently implementing a rangeland health program similar to that of BLM. The Forest Service is preparing environmental analyses for all of their allotments, and in some cases is closing the allotments. This puts increased pressure on both the private and public rangelands near the National Forests.

There is a great need for interagency coordination and cooperation, as well as coordination and cooperation with private landowners, as we increasingly realize that ecosystems are not confined within one agency's jurisdiction, and that what one entity might do will affect his or her neighbors tremendously. To ensure that the anticipated benefits of Rangeland Health and other initiatives truly occur, BLM must work with adjacent landowners so that their actions do not negate the actions BLM will be taking. If BLM and adjacent landowners can cooperate, then the anticipated benefits will accrue; if not, then there will be areas of public land that will not improve to meet its potential due to influences of actions taken on those adjacent lands.

Because of this realization of the inter-connectedness of Federal, State and private lands, there are an increasing number of cooperative and collaborative programs to benefit the environmental health of California and Nevada. Some examples include:

Coordinated Resource Management and Planning efforts in California began in earnest in the 1970s, when several State and Federal agencies signed an MOU. The goal was to foster joint planning efforts across jurisdictional boundaries. CRMP originally focused on range improvement and wildfire prevention by prescribed burning on contiguous lands under multiple ownership. The program has since expanded to include nearly all aspects of land management, including the conservation of biological diversity.

BLM's California Fish and Wildlife 2000 Initiative was started in 1988 to further the goals of conservation and management of fish and wildlife resources on public lands. Main thrusts of the program are cooperation and coordination with other Federal and State agencies and public interest groups to jointly acquire and manage wildlife habitat in the state and to pursue project funding.

An MOU on Biological Diversity was signed by 10 agencies in California in 1991, but now has 37 local, State and Federal agencies participating to coordinate ecosystem management across jurisdictional boundaries.

BLM's National Riparian Initiative, in cooperation with the US Forest Service and the National Resource Conservation Service has been underway for several years. BLM and the Forest Service signed an agreement in 1996 to implement an aggressive improvement program of riparian and wetland areas in the western U.S. A National Riparian Service Team has been established that is working with the agencies, States, and private individuals to assess riparian condition and develop management strategies to improve at-risk riparian areas on both public and private lands.

An MOU for the Coordination of the Management of Undesirable Plants on Federal and State Lands was initiated in California in 1994. There are now 15 agencies cooperating to fight noxious weeds. So far, this effort has established a state-wide data base, agencies are discussing their successes and failures to control weeds, and they are cooperatively seeking funding for weed eradication projects.

The Star-thistle SWAT Team in Lassen County is a partnership between BLM, the Lassen County Agricultural Commissioner, the Farm Advisor, Sierra Army Depot, NRCS, CalTrans, City of Susanville, Lassen National Forest, and CA Dept. of Forestry and Fire Protection to educate private landowners, inventory areas using GPS technology, control known infestation areas, and develop a long range control plan. Last year 55 acres of star-thistle was chemically treated and 20 acres was hand pulled.

Another collaborative management effort specifically designed for a portion of the EIS area is the Modoc/Washoe Experimental Stewardship Program. This program was one of three pilot projects in the western states directed by the Public Rangelands Improvement Act of 1978 to provide incentives or rewards for livestock grazing permittees and lessees to improve range condition of the public rangelands. This program primarily involves the grazing allotments in the Surprise Field Office area and grazing allotments in the adjacent Modoc National Forest. Most of the focus has been in developing consensus based resolutions to resource management problems related to grazing management. This effort still remains as an active participatory decision making group in this area.

Additionally, there are numerous Forest Service programs, and State and private programs that all emphasize coordination and cooperation in maintaining and enhancing the proper function of differing ecosystems on public and private lands within the EIS area.

Rangeland Health

Implementation of the standards and guidelines, cumulatively with the many other state and regional initiatives to protect, enhance, and maintain ecosystem health, will result in improved

rangeland health. There will be less soil erosion, improved vegetative diversity, improved livestock forage, improved upland and riparian habitats, and improved water quantity and quality.

Specifically, improvements to the soils and upland areas will occur slowly over decades and will affect not only upland system components such as soil, water, vegetation, and wildlife, but also downstream components such as water quality and riparian habitat. The most important and basic physical resource on rangelands is the soil (Society for Range Management 1995). Soil conditions, primarily soil structure, influence the movement of air, water, roots, nutrients, and soil organisms. These soil conditions strongly influence plant growth, water infiltration and runoff, and erosion. Utilizing livestock grazing practices which promote upward trends in soil cover, vegetative diversity, and seral stage diversity will have long term positive impacts on the entire ecosystem.

Improvements to riparian areas will result from increased vegetative cover which will result in stabilized aquatic systems, with longer flowing streams, better water quality, protection from erosion and flooding, which will better support wildlife, livestock, municipal water supplies, recreational uses, etc.

Noxious weeds are a growing concern. There will be some immediate small victories. However, even with BLM programs, other Federal and State programs, and cooperative programs as mentioned above, controlling the invasion of noxious weeds and reclaiming those areas already invaded or dominated by weeds will be a long and costly effort. Unless there are considerably more resources budgeted to this effort, we will not see the control of many noxious weeds, much less their eradication, in the foreseeable future.

Ranching and Rural Communities

With or without the standards and guidelines, the demand and need for changes in rangeland management will continue, and these changes may result in declines in livestock use on federal lands over the long term. However, BLM rangeland management policies are not the only factors that affect the western livestock industry and the communities in the study area. There will continue to be pressures from other sources, including: regional population growth; changing demographics, lifestyles, property values, and agricultural subsidies; economic competition and restructuring; and changing laws, policies and practices being implemented by other federal and state agencies.

Over the long term, improved rangeland health will give greater economic stability to many ranchers, better enabling them to continue their traditional ranching lifeways. (However, there may be a few ranchers who will not be able to survive the short-term AUM reductions.) Maintenance of this lifeway, and of the open spaces provided by private ranches, will have a tangible benefit to the quality of life of all of those who live in these rural areas, as well as to those who just visit (of which there will be more and more, as the world becomes increasingly urbanized and people increasingly seek the few remaining wide open spaces).

As mentioned above, of more importance to continuation of the traditional ranching lifeway, and a much greater threat, are the pressures of people seeking out the small communities for recreational activities and "country living." The pressures of other uses on the land, the influx of people with different values, and the opportunities for converting rangeland into housing developments is changing the traditional ranching cultures in many communities, and will

continue to do so during the next century. Along with this are the pressures of a market economy. As reflected in the earlier economic analysis, fluctuations in the price of livestock and the cost of raising livestock will have far greater impact upon the ranching community than will any proposed reductions of AUMs by BLM in either the short- or long-term.

Other Programs and Values

Wildlife species on BLM lands will benefit in both the short and long term. The standards for rangeland health in the preferred alternative would promote the ecological processes and functions that are necessary to sustain native and desirable wildlife populations and communities. Current land use and development trends within California will continue to alter substantial acres of private rangelands and their associated wildlife habitats. The maintenance of the ecological function of BLM rangelands and habitats would help to mitigate wildlife population and community declines that would result from this habitat conversion. BLM lands, in conjunction with other federal, state, and private rangelands managed for "rangeland health," would create a landscape of sustainable wildlife communities, watersheds, and aquatic habitats.

The cumulative impacts of implementing proposed management changes for horse herds on public lands and on National Forests, in conjunction with implementing standards and guidelines (both BLM and the Forest Service), are improved rangeland health conditions in those areas currently failing to meet the rangeland health standards. In most cases, these improved conditions would result in a permanent increase in grass production, with the opportunity to sustain a larger population of wild horses while still maintaining a thriving natural ecological balance within the area.

Future management decisions dealing specifically with wild horses and burros that will be made both on and off the public lands will have more impact upon long-term increases or decreases in wild horse and burro populations, and the health of those populations, than the direct impacts of implementing rangeland standards and livestock management guidelines.

Recreational use of the public lands will continue to grow, with or without implementing rangeland health standards, due to the increasing population pressures within the State and the marketing of California as a vacation destination. In the long term, maintaining the ecological health of the public lands will allow continued use of those lands by recreationists with potential for improved hunting, fishing, camping, and other recreational activities. There will be tangible benefits to America's quality of life gained by maintaining open space on public and private lands, which are maintained and supported to some extent by a grazing economy.

Unfortunately, recreational activities will continue to contribute to environmental degradation unless positive steps are taken to manage those uses. Application of the standards of rangeland health to recreational use is a step that is needed, and will probably be taken within the next five years. If applied as anticipated, this would help prevent some of the negative impacts caused by increased recreational use. If not, we will see increased problems caused by this increased use, and more difficulties in maintaining ecosystem health.

In the long term, Wilderness Areas and Wilderness Study Areas will benefit through the improvement of a healthy and naturally functioning ecosystem. Maintaining or improving the ecosystems through management that reduces livestock impacts will allow the areas to

appear or actually be more natural, and thereby sustain wilderness values. Implementation of standards and guidelines will also reduce potential long term management conflicts between the livestock program and the wilderness management program.

There will continue to be negative aspects to the wilderness program from continued cattle grazing, and the continued human manipulation of natural systems to resolve past livestock impacts as explained in Section 4.2.8.

As long as there is continued access to the public lands, cultural properties will be vandalized and stolen; there will be damage caused by livestock, vehicles, and equipment; and there will be loss of site integrity due to alterations of the site setting and surrounding environment. Again, the severity of effects is related to the intensity of activities. These effects can be caused by grazing activities, but are also caused by recreational activities and other uses of the public lands. These types of activities will continue to increase, putting increased pressure upon cultural resources.

Over the long term, improved rangeland health will provide greater opportunities for Native Americans to utilize resources on public lands that will support the continuation of their traditional lifeways. However, this will be tempered by the increased demands placed upon these resources by other users, especially within the recreational sector.

CHAPTER 5: CONSULTATION AND COORDINATION

5.1 CONSULTATION

During preparation of the draft EIS and following publication of the draft, BLM consulted informally with several federal and state agencies (Forest Service, California Water Resources Control Board, Nevada Division of the Environment, Environmental Protection Agency, etc.).

There was no formal consultation with the U.S. Fish and Wildlife Service (FWS) or National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act. The direction to establish standards and guidelines was previously analyzed in the Range Reform '94 EIS. However, BLM met with FWS and NMFS staff, and both agencies reviewed the Draft EIS. Both agencies provided letters concurring with BLM's conclusion that the measures proposed in the draft document (under all alternatives) would not adversely affect any listed species or any species proposed for listing. Implementation actions will be evaluated to determine if they may affect federally listed threatened or endangered (T&E) species, species proposed for listing, or designated or proposed T&E critical habitats. Before implementing actions that may affect listed or proposed species, the BLM will consult with the Fish and Wildlife Service or the National Marine Fisheries Service as required by Section 7 of the Endangered Species Act. In their letters to BLM, both agencies agreed that this would be appropriate (these letters are attached as Appendix B).

There has also been no discussion with the California Department of Fish and Game or the Nevada Division of Wildlife at the State level about state listed plant or animal species. Implementation actions would be evaluated to determine if they may affect state listed threatened or endangered (T&E) species, species proposed for listing, or designated or proposed T&E critical habitats. Before implementing actions that may affect state listed or proposed species, the BLM will consult with the States.

Before authorizing surface disturbance undertakings at the local level, BLM will identify cultural properties eligible for inclusion in the National Register of Historic Places and consider the effects of the proposed undertakings through the consultation process per Section 106 of the National Historic Preservation Act of 1966.

5.2 PUBLIC PARTICIPATION

The EIS public participation process consists of several phases. We worked with the Resource Advisory Councils (RACs), and we had public scoping to help identify issues and gather information. The draft EIS was subject to further public review and comment during the public comment period. Following the public comment period, this final EIS was developed. This final EIS takes into consideration the comments received during the review period.

Including public involvement throughout the process ensures that the process is open and considers information from all interested parties, including other federal agencies, state and local government, the scientific community, professional organizations, a variety of public land users, conservation organizations, and citizens at large.

5.2.1 Resource Advisory Councils

As BLM was directed to develop the standards and guidelines in consultation with the Resource Advisory Councils (RACs), we first worked to establish the RACs from members of the public as directed in the regulations in 43 CFR 1784. See Map 2 for the area covered by each RAC. Following development of the RACs, BLM resource specialists provided training on basic ecological processes. The RACs then worked with their constituents and with BLM staff to develop standards and guidelines for the areas they represent. Following public scoping, the RACs incorporated some of that public comment into revisions. These standards and guidelines are alternative 1 in this EIS.

Some RAC members also worked with BLM staff to prepare the state-wide standards in alternative 2.

Following the comment period on the draft EIS, the RAC members were sent copies of all of the comment letters. The RACs discussed the comments and the draft EIS in their meetings. Representatives of the three RACs then met with BLM staff in a workshop setting and made recommendations for modification of their original proposals. The original Alternative 1 as modified by these RAC recommendations, along with some changes made by BLM, is the new proposed alternative, Alternative 5.

5.2.2 Scoping

A Notice of Intent was published in the Federal Register on March 25, 1996, announcing the intent to prepare an environmental impact statement for the development of rangeland standards and guidelines in California and northwestern Nevada. This notice also asked for comments concerning the scope of the EIS and Plan Amendments. We received only 2 letters, one merely requesting to be placed on the mailing list.

BLM held three open workshops. Members of the public, members of the RACs, and some personnel from other agencies attended. Following the meeting on June 25, 1996, BLM sent out a state-wide news release and mailed over 1000 letters to potentially interested parties informing them of the EIS process and stating that we would accept public comments at any time. We then received 4 letters requesting that we open another public scoping period.

Due to this newly expressed interest, we opened a second formal scoping period for 30 days during August (although we continued to accept letters well into September). We again sent out a state-wide news release, and mailed out new letters to the previous recipients. From this we received approximately 2 dozen scoping/comment letters. These letters are on file in the California BLM State Office.

Based upon scoping comments that we needed to have an alternative that addressed a rapid recovery or rapid improvement concept, we approached three groups (California Native Plant Society, Natural Resources Defence Council, and Range Watch) for their input. The Native Plant Society (CNPS) provided us with a complete alternative. We used some of their concepts and information to prepare the rapid improvement alternative (Alternative 4).

5.2.3 Distribution of the Draft EIS

The impacts of the first four (4) alternatives were analyzed in the draft EIS, which was released for public review and comment during a 90-day comment period in mid-1997. Copies of the draft EIS were sent to federal agencies, state and local governments, livestock operators and companies, environmental organizations, and many people concerned about the development of standards and guidelines for rangeland health. A copy of the draft EIS was sent to each person who requested it. The draft EIS and the written comments received were also available to the public on a WEB site, and some of the comments were received electronically.

During the public comment period, BLM also met with agencies, interest groups, county supervisors, permittees and others to answer questions about the alternatives, the analysis, and the potential implementation. Groups and agencies that were briefed included: California Cattlemen's Association, CA Farm Bureau Federation, Forest Service (Region 1), US Fish and Wildlife Service, CA State Water Resources Control Board, Environmental Protection Agency (Regional Office), NV Division of Environment, CA Range Management Advisory Committee (CDFFP), CA Native Plant Society, Natural Resources Defence Council, Cal Trout, CA Wilderness Coalition, Owens Valley Indian Water Commission, CA Department of Fish and Game (Bishop), CA Farm Advisor (Inyo/Mono Co), and the three RACs.

5.2.4 Final EIS

This final EIS incorporates comments and changes resulting from the public comment period, from review of newly obtained information, and from additional research and analysis done by BLM in response to those comments and that information. Copies of this final EIS have been sent to federal agencies, state and local governments, livestock operators and companies, environmental organizations, and others who have expressed an interest in the development of standards and guidelines for rangeland health. A copy has been sent to each person who requested it.

A copy of all comment letters appears in the Appendix to this chapter, while responses to the comments within those letters is part of this chapter, beginning with Section 5.4.

5.2.5 Additional Actions

No sooner than 30 days after publication of the final EIS, the California State Director for BLM will issue a record of decision selecting standards and guidelines for California and northwestern Nevada. These standards and guidelines will then be sent to the Secretary of the Interior for final approval.

5.3 LIST OF PREPARERS

The following people, agencies and organizations participated with, and/or provided input to, BLM in developing the standards and guidelines in the various alternatives.

5.3.1 Bakersfield RAC

Tobin, Ed	Off-road vehicle use
Center, Bill	Commercial recreation
Arita, Steven	Energy / minerals
Twisselman, Carl	Federal grazing
Anderson, Linda	Historical / archeological
Timmer, Kerri	Resource conservation
Scott Hennessy	National / regional environmental
Cypher, Ellen	National / regional environmental
Maze, Bill	Elected officials
Saulque, Joseph	Native American interests
Alpers, Tim	Public at large
Pachucki, Walt	Public at large

5.3.2 Ukiah RAC

Cooksley, James	Energy / minerals
Furman, Duane	Federal grazing
Lassiter, Patric	Off-road vehicle use
Engstrom, Thomas	Commercial timber
Evans, Steve	National / regional environmental
Henson, Ryan	National / regional environmental
Katelman, Tracy	National / regional environmental
Reginato, John	Dispersed recreation
Bundy, Burton	Public at large
Bungarz, Denton	Elected officials
Sargent, Richard	Native American interests
Weaver, Dan	Public at large

5.3.3 Susanville RAC

Hansen, Jack	Federal grazing
McGarva, Ken	Federal grazing
Coops, Don	Federal grazing
Kerns, Steven	Federal grazing
Parshley, Jeff	Mining interests
Beaman, Kay	Historical interests

Berrier, George	Wild Horse and Burro interests
Garrod, Tim	National / regional environmental
Heniz, Dan	National / regional environmental
Morphis, Huel	Dispersed recreation
Bixby, William	Local / state government
Dick, Gordon	Public at large
Forrest, Erin	Native American interests
Huffman, Nancy	Elected officials
Jansen, Henricus	Academia

5.3.4 Public Interest Groups, Agencies

California Cattlemen's Association
California Farm Bureau Federation
California Native Plant Society
California State Water Resources Control Board and Regional Water Quality Control Boards
Natural Resources Defense Council
Nevada Division of the Environment
U.S. Forest Service
U.S. Environmental Protection Agency

5.3.5 BLM Preparers

The following BLM staff contributed by working with the RACs, providing resource information, doing analytical work, and writing the EIS.

Anthony-Wheeler, Jennifer	Natural Resource Specialist, Arcata R.A.
Bardwell, Pardee	Range Conservationist, Clear Lake R.A.
Borchard, Steve	Soil Scientist, Redding R.A.
Bosworth, John	Environmental Coordinator, Eagle Lake R.A.
Brink, Paul	Wilderness Coordinator, California State Office
Cooney, Frank	Outdoor Recreation Planner, Surprise R.A.
Cotterill, Bruce	Range Conservationist, Hollister R.A.
Cranston, Peggy	Wildlife Biologist, Folsom R.A.
Decker, James	Riparian Coordinator, California State Office
Delaney, Leroy	Field Manager, Ridgecrest R.A.
Devalois, Tara	Range Conservationist
Dodge, Douglas	Supervisory Resource Management Specialist, Bishop R.A.
Doran, Karen	Natural Resource Specialist (Range), Caliente R.A.
Farschon, Roger	Wildlife Biologist, Surprise R.A.
Fontana, Jeff	Public Affairs Specialist, NorCal Support Team
Gish, Mark	Range Conservationist, Bishop R.A.
Hansen, Linda	Field Manager, Eagle Lake R.A.
Halford, Anne	Botanist, Bishop R.A.
Knox, Anne	Coop. Educ. Trainee, Botany, California State Office

Lorentzen, Ed	T&E Species Coordinator, California State Office
Mauck, Ralph	Range Conservationist, Eagle Lake R.A.
Mercer, Larry	Public Affairs Specialist, Bakersfield District Office
Mills, John (Jack)	Environmental Coordinator, California State Office
Molter, Joseph	Natural Resource Specialist, Redding R.A.
Morrison, James	Rangeland Management Specialist, California State Office
Saslaw, Lawrence	Wildlife Biologist, Bakersfield District Office
Stokke, Susie	Field Manager, Surprise R.A.
Visser, Kenneth M.	Lead Range Conservationist, Eagle Lake R.A.
Wagner, Joseph A.	Range Conservationist, Alturas R.A.
Willoughby, John	State Botanist, California State Office
Wingate, George	Watershed Management Specialist, Eagle Lake R.A.

Maps were prepared by the California State Office, GIS Staff, Donna Smith, coordinating.

5.4 RESPONSE TO COMMENTS

The BLM received 47 comment letters from a variety of individuals, organizations and agencies. Comments have been addressed if they relate to inadequacies or inaccuracies in the analysis or methodologies used; identify new impacts, recommend reasonable alternatives or mitigation measures; or involve substantive disagreements or interpretations of significance. The comments generally fell within the following categories: NEPA Process, Riparian Health, Vegetation, Grazing, Monitoring and Implementation, Threatened and Endangered Species, Economic and Social Impacts, Wildlife, Water Quality, Other Resource or User Impacts, and Standards and Guidelines.

Letters were submitted by mail, e-mail, faxed or hand-delivered, and included typed and hand-written text. The full text of these letters, along with a list of commentors, is in Appendix A attached to this volume. Most of the letters are direct reproductions of the letters we received; however, a couple of the letters were re-typed by BLM due to the poor quality of our reproduction.

Each letter has been assigned a number, in order of its receipt (the list is at the beginning of Appendix A). BLM has gone through each letter and identified those portions of the letters that made a statement or suggestions, or requested a response. These comments were then numbered consecutively.

There were a number of comments that addressed larger topics that BLM felt should be addressed in-depth, as well as comments from different individuals or groups that addressed the same topics. Responses to these comments are in the following section, 5.4.1.

The individual comments are addressed in Section 5.4.2.

5.4.1 General Responses to Comments

There were a number of comments that addressed larger topics that BLM felt should be answered in-depth, as well as comments from different individuals or groups that addressed the same topics and are more easily answered in a single explanation. The topics covered in this section include the NEPA Process, Utilization and Residue Levels, Implementation and Monitoring, Soils, Impacts from other Programs and Uses, Recreation, Wilderness

Process

Comment: Several comments stated that the DEIS is inadequate and should be supplemented or reissued for various reasons, including that BLM failed to adequately address a proper range of alternatives, failed to address the proper "no action" alternative, provided insufficient data (and has data gaps) for the public to make adequate analysis, and failed to address cumulative impacts.

Response: BLM will not reissue the DEIS, for the reasons explained below.

1. **Failure to address the correct "no action" alternative.** Commentors requested that BLM address what were current grazing practices, because they felt that those actually comprise the no action alternative.

The new grazing regulations require certain actions be taken, including implementation of the fallback standards and guidelines by a certain date, if a state has not developed its own standards and guidelines. As required by the regulations, the "fallback" standards and guidelines are currently being implemented (see Appendix 21 for the implementation plan). There is no option of not implementing those standards and guidelines pending the development of other standards and guidelines. Therefore, the "fallback" standards and guidelines are the "no action" alternative.

However, what was the current situation is indeed addressed. The descriptions in Chapter 3 -- The Affected Environment are the existing situation that developed under what was current grazing administration prior to the implementation of the fallback standards and guidelines. These descriptions are of the "no action" alternative requested by the commentors, although there is no specific analysis of what would transpire if this system were left in place. Although it might have had some value for comparison, this analysis was omitted from Chapter 4 because it is not a valid alternative under the regulations and BLM does not have the discretion to choose it as an option. The national EIS for Rangeland Reform 94, which included an analysis for possible Bureau-wide standards and guidelines, including the fallbacks, addressed what was the current situation as a no action alternative.

2. **The range of alternatives was inadequate.** BLM should analyze the draft alternative provided by the California Native Plant Society (CNPS), alternatives provided by the CA State Water Resources Control Board (SWRCB), and others.

The proposal provided by CNPS was reviewed by the EIS team. There were several valid, worthwhile suggestions in that alternative that were incorporated within Alternative 4 in the DEIS. However, there were several features of the CNPS alternative that were

dropped because they were arbitrary and could not be implemented under the regulations or were so narrow and restrictive that they could not physically be met even in areas that are healthy, properly functioning ecosystems.

The prime example of these types of suggestions was for the automatic reduction of grazing by 20% in any area not meeting a standard, to be followed by another 20% reduction each year that an area continues to not meet the standard. This action could not be implemented or supported according to the regulations. A second example was the suggested standard that only 5% of any area could be bare ground. This standard would be difficult to meet in a well functioning riparian area. Most upland areas in the Great Basin, even properly functioning grasslands, may have more than 5% bare ground.

Suggestions from other organizations and agencies such as SWRCB have been considered and are included in the final EIS where appropriate.

3. **The level of analysis was too general.** Several commentors stated that the level of analysis was too general, with a request that BLM provide data for each and every allotment, and provide analysis at the allotment level. They also requested specific allotment by allotment schedules for implementation, information on specific allotment problems, what will be done on each allotment, and when it will be done.

The intent of the EIS, as stated in Chapter 1, is to develop Standards and Guidelines for grazing management for the entire region managed by California BLM. For that purpose, a general state-wide analysis is necessary. The summary projections provided are sufficient to make a judgement of whether an alternative would meet the goal of providing adequate standards and guidelines.

Since the DEIS was issued, the resource areas have prioritized their known problem areas and responded with an implementation schedule of which allotments need management attention prior to the next grazing season, and what assessments are planned during the next couple of years, based upon their current funding levels and their priorities. This information is provided in Appendix 21, and should satisfy many of the questions directed at the lack of data or lack of specific implementation plans within the DEIS. There is also a discussion on monitoring in Appendix 22 that may prove helpful.

Most people understand the general nature of this document and the fact that a general environmental analysis is needed. However, BLM wishes to reaffirm to the public our commitment that as the Resource Area staffs develop and implement specific changes on specific allotments, we will comply with the NEPA process, and involve interested parties, as well as the grazing permittees, in the decision-making process.

4. **BLM failed to address cumulative impacts.** There were a couple of comments that BLM failed to meet the NEPA requirement for addressing cumulative impacts.

BLM did not address cumulative impacts in all areas, and did not have a separate cumulative impacts analysis section. The EPA also pointed this out to us. Following

their recommendation, the cumulative impacts analysis has been included in a separate section of Chapter 4 of the final EIS.

Utilization and Residue Levels

Comment: Following publication of the draft EIS, there were numerous comments made about whether utilization and residue (stubble height) guidelines should be used to help achieve rangeland health in sagebrush steppe areas.

Response: Due to the nature of the comments, BLM did an extensive literature review and analysis of this topic. Appendix 20 contains a detailed discussion of the basic issues that were raised during the comment period, and the validity of using utilization and residue as measures to help achieve rangeland health.

The lessons from the studies that were reviewed are that stocking rate and utilization are more important than grazing systems in improving rangelands and that attention must be given to maintaining conservative stocking rates and utilization levels at all times during the year. One or even two years' rest cannot be expected to make up for heavy use during even a single year.

Based on the review of existing information it is clear that it is not only possible but desirable to set Statewide guidelines on proper utilization and residue (stubble height) levels for the two major vegetation types, sagebrush-steppe and riparian vegetation. These guidelines will be used unless and until they are modified by site-specific (e.g., allotment or group of allotments) guidelines. The guidelines (incorporated into Alternative 5) will be the same as those recommended under Alternative 4, for both the utilization levels for uplands and the stubble height requirements for riparian area. The scientific literature supporting these levels seems clear. (An annotated bibliography covering this topic follows the reference section in Volume 1 of this Final EIS.)

Implementation and Monitoring

Soils

Comment: Comments were made requesting that specific numerical standards be developed and used for soils -- specifically suggest some appropriate standards of these indicators (of rangeland health) [reference to "Rangeland Health Evaluation Matrix" (National Research Council, 1994), Appendix 1, pages 1-2, in this EIS].

Indicator: surface aggregate stability, standard: similar to ungrazed site

Indicator: % cover by bare soil, standard: < 5% bare soil.

Indicator: rooting depth, standard depth to "common" root abundance.

Indicator: soil compaction, standard: bulk density +/- 5% variation from ungrazed site.

Indicator: streambank trampling, standard: equivalent between grazed and ungrazed sites.

Response: The National Research Council proposed the indicators of rangeland health that involve simple and mostly visual estimates. Limited field tests were carried out to evaluate utility. They found that placing the boundaries between healthy, at risk, and

unhealthy rangelands is not clear and requires judgement. Indicators are used to build "a preponderance of evidence" rather than establish absolute numerical thresholds.

An interagency workgroup is working on an assessment procedure for rangeland health that relies on qualitative measurements or judgements. A draft of this procedure is included as Appendix 25 of the FEIS. To characterize the health status of a selected landscape, indicators are used to assess the condition of selected plant and physical environment attributes. An indicator is a component of a system whose characteristics (presence or absence, quantity, distribution) are used as an index of those attributes that are too difficult, inconvenient, or expensive to measure. Soil stability and proper watershed function are important because they promote normal capture, storage and release of water. The assessment procedure includes four categories: 1) Cover by vegetation lifeform and ground cover; 2) Species abundance relative to dominant plant cover; 3) Physical environment status based on 10 indicators; and 4) Biotic environment status based on 8 indicators.

Physical environment indicators of soil and watershed condition are: flow patterns, surface litter, soil movement by water or wind, soil crusting and surface sealing, compaction layer, rills, gullies, cover amount, and cover distribution.

Bare soil is evaluated during the evaluation of litter distribution and incorporation. To request the standard be < 5% across the landscape and without regard for variation between natural healthy ecosites, demonstrates a lack of understanding of the variety of conditions on rangelands in California. Many sites in excellent condition have >5% bare soil even if ungrazed.

The proposal for a standard which seeks parity of grazed and ungrazed depth to a "common" (10-100 very fine or fine roots/decimeter²) root density is a reasonable standard. However, a similar standard which accomplishes the same goal might read "parity in root abundance and depth between grazed and ungrazed sites." An inference could be made, based upon the appearance of similar above ground foliage distribution and abundance, that parity of root distribution exists.

Soil compaction as measured by comparing bulk density can be inferred by other indicators such as evidence of excessive runoff, plant distribution differences, or root distribution.

We disagree with stream bank trampling standards. PFC provides a methodology for assessing the physical function of riparian and wetland areas. The preferred alternative contains riparian guidelines which require "root masses sufficient to stabilize stream banks," "80% vegetative cover," "adequate stream bank stability," "sufficient herbaceous forage biomass to meet the requirement....bank protection....," and "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks...." We feel that these guidelines adequately protect streambanks.

Impacts from other Programs and Uses

Comment: Wild horses and burros, recreational uses, mining and other programs all have an impact upon rangeland health. Many commentors requested that we analyze those impacts.

Others stated that those activities on public lands should be held to the same standards of rangeland health as the grazing program.

Response: The commentors are quite accurate in their assessments that other BLM programs affect the environment as much or more so than grazing. This fact was consistently mentioned in the DEIS, without going into great detail, and the issue is being discussed by BLM at the national level. However, the purpose of this EIS is to establish standards and guidelines for grazing management, not to analyze the entire spectrum of BLM programs.

Recreation

1. Comment: Some commentors questioned the high economic value of recreation to local economies because of a belief that recreational users do not pay fees, and make most of their expenditures in their own towns, not in the rural communities near BLM lands. Others raised a concern that recreation actually increases local costs due to crime and increased law enforcement needs. Another requested the source for the value of \$400-500 million given to recreation expenditures in the DEIS.

Response: Some recreational users pay fees, some don't. The casual visitor, whether on OHV, mountain bike, or foot does not directly pay a fee for recreating on most public lands managed by BLM. However, operators of businesses who profit from recreation on public lands pay a fee for their permits (examples are pack trips, OHV events, races, etc.), and also obtain insurance to indemnify the BLM. The fees paid to BLM vary depending upon the size of the event, the duration, and the profit.

Assuredly, big ticket items such as motor homes, OHVs, and trailers, as well as many other items such as fishing rods, tents, and even groceries are primarily purchased near one's residence. However, a tremendous amount of money is spent in small rural towns near BLM lands. As an example, the economy of Bishop, CA (Inyo County) is largely dependent upon tourism and recreation use. Local expenditures include motels, restaurants, groceries, fishing guides, tackle, boat rentals, gasoline, etc. In a report for the State of California Tourism Department and the Department of Parks and Recreation (Runyan 1994), Dean Runyan Associates states that the **average** rural camper spends \$62.84 per day in the rural location of his or her vacation.

There are no doubts that along with increased recreational use and tourism, there may be some increased costs for search and rescue, law enforcement, etc. Search and rescue costs, though, are commonly billed to the home county of the individual involved.

The value to the local economy of recreational use on public lands given as \$400-500 million was an error. This has been changed in the text. The correct figure of \$200 million is an estimate derived from several economic studies of recreation and tourism within the state by the State of California and the Outdoor Recreation Coalition of America (see Calif. Dept of Parks and Recreation 1994; ORCA & SMGA 1995 and 1997; and Runyan 1994). Within the context of California's economy, travel and tourism are growing at a rate that by the year 2000, California's tourism will be the largest

industry in the world (reported by John Poimiroo, Deputy Secretary of the California Trade and Commerce Agency in a memorandum to the California Park and Recreation Leadership Institute in December 1997).

2. Comment: A couple commentors suggested that we should discuss how recreational opportunities would be affected by the alternatives.

Response: The DEIS stated that recreational opportunities would improve with improved health of the ecosystem. Specific opportunities were not addressed due to the general (non site-specific) nature of the EIS.

As an example, if the proper functioning condition of a stream improves, the aquatic species habitat generally improves too. However, the site specific decision (made in a Resource Management Plan or through some other planning document) to manage for a certain species would dictate what type of vegetative community and structure would be desired. Management for a recreational fishery with a more open vegetative community providing fishing access would increase that recreational opportunity. However, managing for an endangered species of snail darter (removing exotic salmonids and allowing dense vegetative cover to develop) would not provide the same recreational opportunity. However, the change in habitat might benefit certain types of birds, and thereby provide an increased opportunity for bird watchers.

3. Comment: One commentor suggested that BLM should consider the negative impacts to wildlife and hunters of developing the S&Gs and improving rangeland health. There was concern that BLM only discusses the advantages to be obtained by the livestock industry.

Response: There are no known detrimental impacts to wildlife (general) or recreationists from improving the health of the ecosystem by better managing livestock use. In general, a proper functioning ecosystem will better support wildlife, and thereby support hunters and other recreationists. There may be some adverse impacts in specific areas due to the management goals for that area (see example in #3 above), but these are not due to better managing grazing.

Wilderness

Comment: Several comments asked if provisions of the Wilderness Act or IMP policy take precedence over grazing in Wilderness or Wilderness Study Areas (WSAs) that are being adversely impacted by grazing (can or will BLM construct range improvements, etc., in these areas in violation of the Wilderness Act and IMP policies?).

Response: The Wilderness Act or other enabling legislation for wilderness areas and the Interim Management Policy (IMP) for wilderness study areas guides our management of those areas. Decisions to construct facilities to improve rangeland health, and thereby allow continued grazing, in designated wilderness and wilderness study areas are, and will be, made on a case-by-case basis following a complete multi-disciplinary environmental review under NEPA.

For WSAs, the guidance is clearly spelled out in the BLM Handbook 8550-1, the Interim Management Policy for Lands Under Wilderness Review. The law provides for, and

BLM policy is to allow, continuation of grazing uses on lands under wilderness review in the manner and degree in which these uses were being conducted on October 21, 1976 (the date of the passage of FLPMA), as long as they do not cause unnecessary or undue degradation of the lands. This is a "grandfathered" use under FLPMA.

Specific criteria to be used in making a decision are described in the handbook starting on page 10, under the heading of (6) Enhancing Wilderness Values, starting on page 19, under the heading of (B) Procedures for Evaluation of Proposed Actions, and starting on page 40, under the heading of (D) Rangeland Management.

For Wilderness Areas, Congress made specific exemptions within the Wilderness Act, and in several subsequent enabling Acts, to allow continued grazing (as explained in Chapter 3, page 58 of the DEIS). Grazing in BLM wilderness is managed under 43 CFR 4100 and 43 CFR 8560. The BLM manual 8560, entitled "Management of Designated Wilderness Areas," provides additional guidance.

The bottom line is that BLM can and might construct facilities that would enhance rangeland health and allow continued livestock grazing in wilderness areas or WSAs. These decisions would be made on a case-by-case basis, and would not be in violation of the Wilderness Act or the IMP.

5.4.2 Responses to Individual Comments

The individual comments are addressed in this section. Each of those comments is identified by a number, such as 1-3, or 16-24. The first number identifies the letter, and the second number is the comment BLM identified within the letter (e.g., 1-3 is the third comment from the California Cattlemen's Association, who submitted the first response letter; and 16-24 is the twenty-fourth comment from the NRDC and CNPS, who submitted the sixteenth response letter).

The full text of these letters, along with a list of commentators, is in Appendix A attached to this volume.

Comment Letter 1 -- California Cattlemen's Association

Comment 1-1: True. See general responses section 5.4.1, under Process.

Comment 1-2: Allotments that are meeting standards, or where the problem is not grazing related, fall into Categories 2 & 4 (see Chapter 2 and Appendix 21). In most cases, grazing management would not be changed in those areas to meet rangeland health standards.

Comment 1-3: There will be no arbitrary removal of livestock. However, if livestock removal (or reduction) is the best way to solve a problem, then that may occur. Such decisions will be made in consultation with affected permittees and concerned parties.

Comment 1-4: BLM will continue to be challenged, as it has in the past, to determine rangeland health conditions and how to improve those conditions. Decisions will be made in consultation with affected permittees and concerned parties. The implementation schedule (Appendix 21)

briefly outlines initial planned strategies based upon current knowledge. We expect that there will be some changes made as on-the-ground conditions are more closely examined by BLM staff, permittees, and interested parties. In any case, a documented evaluation should be made for each allotment verifying what the conditions are. In instances where collaborative determinations cannot be made because of disagreement, any interested or affected party may legally challenge the decision through the appeals process. While it is BLM's goal to use the "best science" available to make determinations and management prescriptions, it is also the responsibility of all those affected to help identify what the "best science" is for the specific situation.

The regulations do not allow delaying management changes until permits or leases are renewed as you suggest. BLM is required to determine the initial management changes needed prior to the start of the next grazing period regardless of the availability of adequate personnel and financial resources. (One reason we did not select Alternative 4 is that it could not be implemented with current budget and personnel restrictions.) Modified terms and conditions, where needed, and as determined from these initial evaluations, will be reflected as modifications to existing permits or leases. When permits or leases are considered for renewal or transfer, a close review and evaluation of the condition of the allotment would again be needed to determine what terms and conditions would be most appropriate for the new permit or lease. This will often require a formal allotment evaluation, with the appropriate NEPA analysis. The magnitude of the evaluations and processes will depend upon the anticipated specific resource management changes needed and the interest of the affected parties.

Comment 1-5: BLM Manual 6840 provides guidance for State Directors to designate sensitive species. These species include those that could easily become endangered or extinct within a state. In California, a list has been designated through nominations from each field office to the State Director. The species on this list are typically those that are not yet designated by the US Fish and Wildlife Service (FWS) and/or CA Fish and Game Commission, but for which BLM has determined that special management is necessary to reduce or eliminate threats that might require FWS or the State to list the species in the future.

Comment 1-6: A standard is by definition a set goal or condition to be achieved. A trend toward meeting the standard, although desirable, is not the standard itself. The regulations specifically provide that BLM determine where significant progress is being made toward meeting the fundamentals of rangeland health. The implementation strategies fully recognize this direction, and it is used as a criteria for determining priorities (Appendix 21).

Comment 1-7: A healthy, properly functioning ecosystem is one which is "active and maintains its organization and autonomy over time and is resilient to stress" (Haskell et al. 1993). This requires that the system maintain an "integrity of nutrient cycles, energy flows, plant community dynamics, and intact soil profile, and stores of nutrients and water" (National Research Council 1994).

If there is a problem with an allotment meeting the standards due to grazing (whether season long or otherwise), then grazing management will be adjusted to correct the problem. The RACs chose not to change this wording.

Comment 1-8: The RAC did not recommend changing this. The assumed intent is that periods of rest during critical plant growth would be applicable to all rangelands where and when

needed to achieve proper functioning conditions, recovery of vegetation or desired plant community, irrespective if the cause was an episodic event or not.

Comment 1-9: We believe utilization and stubble height guidelines are an effective tool for meeting standards and that these can be set on a regional basis. Field managers are free to change these regional guidelines as appropriate for site-specific management. See the expanded discussion of utilization in Chapter 3, Section 3.2.5, and the annotated bibliography on utilization, as well as responses to comments 4-4 and 11-1. We also believe that the degree of streambank trampling is an effective monitoring tool to be used in meeting the standards.

Comment 1-10: The BLM intends to evaluate the diversity and abundance of insects and amphibians as indicators of healthy ecological processes. We recognize that environmental factors of habitat capability, population characteristics, regional/global influences, local demographics, etc., must be considered when assessing rangeland health. BLM must consider the cause-and-effect relationships between grazing (or other management) and insect and amphibian populations when applying this riparian health standard.

Comment 1-11: This would apply to any newly proposed facility. However, application to existing facilities would depend upon whether there was a problem caused by the existing location. This concept is also identified and supported in the set of proposed Best Management Practices (BMPs) for water quality found in Appendix 10.

Comment 1-12: This guideline is contained within all 3 regions in the preferred alternative (Alternative 5) of the Final EIS.

Comment 1-13: BLM's policy is to aggressively control the invasion of weed populations. We will continue to fight weeds as aggressively as personnel and funding allow.

Comment 1-14: See response to comment 1-6.

Comment 1-15: See response to comment 1-9.

Comment 1-16: See response to comment 1-12.

Comment 1-17: Guideline 14 has been eliminated from the preferred alternative (Alternative 5) in the Final EIS. It has been replaced by Guideline 16 which, for the reasons given in Section 5.4.1 and comment responses 1-9, 4-4, and 11-1, we believe is necessary to manage for rangeland health.

Comment 1-18: The fallback guidelines were approved through previous analysis and action, and are part of the current regulations. They are in effect until new guidelines are approved.

Comment 1-19: These guidelines apply only when grazing is the cause of a problem. For the rapid recovery alternative, the quickest, easiest fix was to remove livestock. The assumption was made that after fencing or other management options were in place, some of the livestock could be better managed and allowed back into an area. We recognize, however, that some upland areas, particularly those in lower seral stages, may not improve with removal of livestock (see response 4-4 for a more detailed discussion).

Comment 1-20: Overutilization of the range can impair rangeland health. For a complete review of the utilization / residue issue, see the utilization response in section 5.4.1, the utilization discussion in Appendix 20, and the Annotated Bibliography.

Comment 1-21: See response to 1-9.

Comment 1-22: Your conclusion is reflected in our analysis. It is highly unlikely that BLM will receive adequate appropriations from Congress to implement Alternative 4.

Comment 1-23: Comment noted. Chapter 3 has been changed.

Comment 1-24: Comment noted. However this is not included in the analysis because it does not affect the decision.

Comment 1-25: We concur and have made the change you suggest.

Comment 1-26: Since the draft was released, the Field Offices have been working to refine the data. Appendix 21 contains an implementation plan with a complete list of which allotments are known to have problems and which are unknown and will need further review. The analysis was done by Field Office staff using their inventory and monitoring files for each allotment, as well as their personal knowledge of the allotments. As monitoring data is not current for each of the allotments in the state (many are small isolated parcels surrounded by private land), there will be some further inventory necessary. Where management changes have already been made and allotments are already progressing towards meeting the standards, monitoring of the progress will be done, and there will probably not be any immediate changes.

Comment 1-27: While there may be too much litter to meet particular site-specific objectives, such as habitat for giant kangaroo rats, other special status species or particular desired plant communities, it is doubtful that too much litter would ever result in communities that do not meet the standards of rangeland health (other than those related to special status species).

Comment 1-28: Section 4.4.4.1 of Chapter 4 analyzes some of the causes of a "failure to meet soil standards." Among these causes are dominance by exotic annuals, fire, lack of fire, and improper road drainage.

Comment 1-29: We agree with you about the value of private rangelands to the conservation of vernal pools in California. We also recognize the interdependence of private lands and federal grazing allotments and will certainly consider the effects of any actions we take on BLM lands on any private lands that are base property for BLM allotments. Most remaining vernal pools in the EIS area, however, occur in and immediately around the Central Valley, an area where BLM lands do not comprise much of the land base. It is doubtful that implementation of these standards and guidelines will have much economic or ecological impact on vernal pools on private lands.

Comment 1-30: The overgrazing of the sagebrush steppe by domestic livestock in the years prior to the passage of the Taylor Grazing Act in 1934 is well documented. See accounts in Burcham (1957), in Young et al. (1977), and in Miller et al. (1994). Although Burkhardt (1996) asserts that the plants of the sagebrush steppe co-evolved with large, now extinct, grazing ungulates prior to the end of the Pleistocene, it is very possible that those plants could have lost whatever resistance to grazing they may have once possessed during the last 10,000 to 12,000

years (see Belsky 1992 and Baker 1992). Additionally, although the plant species extant today likely evolved when these now extinct large grazing ungulates were alive, their distribution on the landscape has probably changed markedly since the Pleistocene. During the Pleistocene they may have occupied areas that were little grazed. Miller et al. (1994) point out the drastic changes in vegetation composition that have taken place even since the Pleistocene. The lack of resistance to grazing of one of the dominant presettlement perennial bunchgrasses, bluebunch wheatgrass, is well documented (Mack and Thompson 1982; Anderson 1991). Even if Burkhardt's conclusions are true, and the native bunchgrasses are tolerant of the type of grazing pressure the extinct herbivores placed on them, they are certainly not tolerant of season-long, continuous grazing, a fact that Burkhardt (1996) recognizes.

Comment 1-31: True. Some impacts of recreational use are mentioned in Chapters 3 and 4, and some changes have been made to Chapter 3. This EIS is about grazing standards and guidelines, not recreation. To analyze all of the impacts to riparian areas by recreation would require extensive studies and documentation. Leaving the analysis as is shows our awareness of the problems, but does not seek to address those problems here. (See general response to impacts of other programs and uses in section 5.4.1.)

Comment 1-32: See general response to recreation in section 5.4.1. The research sponsored by the California Department of Tourism documents that millions of tourism-related dollars are expended every year in communities and counties near BLM land. The table on page 72 in Chapter Three lists 1995 expenditures for the nine principal grazing counties in the EIS. Three of those counties have significant public land and grazing. The research documents that tourism is a primary economic factor for local communities in Mono County. Tourism in Lassen County is also a very significant part of the economy. Although much smaller than the other nine counties, the tourism impact in Modoc County is still worth 26 million dollars. By comparison, livestock sales in Modoc County in the same year totaled a little over 11 million dollars.

Comment 1-33: The statement by Kattelman and Embury (1996) is not meant to imply that the only option for improving riparian areas is complete removal of livestock grazing (though that is one option that has been applied on BLM lands and elsewhere in California and the West). It was cited to show that the capability is great for recovery of riparian vegetation that has been degraded by past grazing practices. As we point out in a new paragraph we have added to Chapter 3, Section 3.4.2, and in our responses to comments 16-30 and 26-5, there are several other types of grazing management that can be employed to improve riparian vegetation.

Comment 1-34: These factors also contribute to local and or regional influences on mule deer populations, but do not fully explain the mule deer declines since the 1960's.

Comment 1-35: Noted in Chapter 3.

Comment 1-36: The harmful effects of pesticide use in Central and South America may result in declined populations of neotropical birds, but this does not reduce the importance of riparian habitats on BLM lands in California for these species.

Comment 1-37: Chapter 3 has been changed.

Comment 1-38: BLM will not implement standards and guidelines, and is not implementing fallback standards and guidelines, without consideration of the effects of other uses on the range in addition to livestock. As noted in the comment, current wild horse populations are in some cases much higher than AML's. Standards attainment and/or maintenance will be difficult to achieve in HMA's with excess animals.

Management of Wild Horses and Burros is governed by the Wild Free-Roaming Horses and Burros Act (1971), while management of livestock grazing is governed primarily by the TGA, FLPMA and PRIA (see Appendix 3).

The Interior Board of Land Appeals has found that under the Wild Free-Roaming Horses and Burros Act, a BLM decision to remove wild horses and burros or to adjust AML's should be founded on an analysis of appropriate resource information (such as grazing utilization, trend in range condition, actual use, climactic factors and observational data) that indicates that removal is necessary to restore or maintain a thriving natural ecological balance among wild horse populations, wildlife, livestock and vegetation and to protect the range from the deterioration associated with overpopulation.

The need for this analysis exists even if an AML was established in a land use plan. In some cases, land use plans established wild horse and burro population ranges as a baseline with the expectation that the resource effects of use at the allocated levels would be monitored along with the effects of the other plan allocations and management decisions. Analysis of monitoring information that pertains to the resource effects of wild horses and burros, livestock and wildlife use within the HMA then supports a BLM decision to make use adjustment(s). Analysis is complicated when, as is often the case, HMA boundaries do not correspond with grazing allotment boundaries or wildlife habitat ranges. Moreover, analysis of the collected monitoring information may show that the information that was gathered is not useful for answering the appropriate questions, yields inconclusive results, or has significant gaps. The fourth column of Table 3.7 in the EIS denotes the AML's that were established in land use plans (most of which are now ten to fifteen years old) with an asterisk. These AML's must be analyzed in light of monitoring information before wild horse and burro population adjustments can occur.

BLM is now analyzing the monitoring information it has collected in portions of the Twin Peaks HMA, and for the Fox Hog and High Rock HMA's. Except for a portion of the Twin Peaks HMA, these HMA's have not yet had their AML's evaluated as prescribed by IBLA. Depending on the results of these analyses, BLM will either confirm or adjust the AML's and, if needed, take appropriate action "on-the-ground" in FY 98 and FY 99. Analysis of the other AML's established in land use plans (Fort Sage, Ravendale, Red Rock Lakes, Devils Garden, Massacre Lakes and Carter Reservoir HMA's) will occur in due course depending on management priorities.

In 1997, BLM removed horses from the Coppersmith and Buckhorn HMA's and their wild horse populations are now within their AML range. These AML's were established in 1995 following an analysis of monitoring information. Other HMA's that had their AML's established in 1995 following analysis of monitoring information include Wall Canyon, Nut Mountain and Bitner. They are scheduled to be returned to their respective AML ranges in FY 99. Monitoring will continue within the Montgomery Wild Horse Herd Territory and currently there are no plans to adjust the population of this herd.

Comment 1-39: See general response to recreation in section 5.4.1.

Comment 1-40: The EIS states that some areas are degraded by grazing. It did not attribute all water quality problems to grazing, nor state that grazing is the only source of giardia. We fully recognize other sources of contamination. However, that does not relieve us from addressing these concerns in regards to livestock grazing. The specific reference to giardia has been removed from Chapter 3.

Comment 1-41: Ranching is not the only practice that has impacted Native American lifeways. However, it is well documented (Lanner 1981, Grayson 1993, Cook 1996, Jordan 1993, Castillo 1978, and others in Heizer 1978 and D'Azevedo 1986) that ranching and the introduction of livestock has directly and severely affected the ability of the Native Americans to pursue their traditional lifeways. Indeed, the introduction of domestic livestock totally eliminated the Native Americans' ability to practice their traditional lifeways.

Comment 1-42: The table reflects herd size as the significant factor in determining costs and returns, and any relationship to regulatory costs is conjectural. It must be noted that the most profitable operations, in the study cited, had the largest herd sizes and the size factor lowers production expenses (table on pg. 64). The text also notes on page 63 that the lower return per cow for operators with a high dependency on federal forage is partially due to the lower nutritional value of federal forage. This is particularly true for operations with late season grazing in the Intermountain West. On late summer and fall BLM ranges the grasses and forbs dry out and lose nutritional value. In these situations, research has shown that range cattle gain little and can even lose weight. This is a major factor in the lighter weights of sale cattle and therefore lower profits for some operations using public land.

Comment 1-43: While some overlap of grazing and non-grazing program costs is inevitable, the BLM cost accounting for rangeland management attempted to focus only on agency expenditures required by grazing use. Costs associated with wildlife, fisheries, fire rehabilitation projects, etc, would not be included in the cost figure here.

Comment 1-44: The information in the DEIS table is correct. A key reason for the drop in personal income is the significant drop in employment during the time period of the statistics. Also note that personal income and sales are different statistics. Sales can increase and income decrease because of higher production costs.

The much larger economic value for livestock cited in the comment is a different statistic than the one used in the DEIS. Receipts from livestock sales are used for the impact analysis because that is a meaningful statistic relative to livestock operations using public land. The larger figure in the comment includes cattle sales and all related economic activity including processing, transportation, packaging and financing. The income statistic provides the context for the impact analysis in chapter four which concluded that the potential AUM reductions will not have a significant impact on California agricultural income or livestock industry income. The use of the larger cumulative economic statistic would not change that conclusion.

Comment 1-45: The California livestock inventory figure does include dairy cattle. State-wide range cattle numbers were not available. Even if dairy cattle were excluded in the livestock inventory statistic, it would not change the conclusion in Chapter 4 relative to the economic impacts in the EIS study area. The recent depressed cattle market and lower inventory numbers are highlighted a few pages later on page 73 in the section on the principal grazing counties.

Comment 1-46: As discussed in section 3.2.2, permit non-use is due to many factors with market prices playing a major role.

Comment 1-47: The source of information presented in the table on the county impacts of tourism is: California Travel Impacts by County, 1995, California Division of Tourism, 1996.

Comment 1-48: \$2,215 per acre for ranch land is not the figure used in the impact analysis in Chapter 4 for the same reason cited by this comment, i.e., it is not representative of a large part of the EIS study area of concern, particularly Modoc, Lassen and northern Washoe counties.

Comment 1-49: Alternative 3 was not selected as the preferred alternative for these reasons.

Comment 1-50: Grazing can be beneficial, or it can be detrimental. It is well documented that temporary removal of grazing or lowering livestock numbers is the best option for improving conditions in many situations.

Comment 1-51: Prescribed fire will continue as a management tool under the preferred alternative.

Comment 1-52: See response to comment 1-50.

Comment 1-53: Chapter 4 states that mule deer use, succession, etc., would be key discussion points in developing management objectives on grazed allotments. We believe this discussion at the allotment level would best balance the needs of mule deer and seral stage objectives.

Comment 1-54: Since forage does not appear to be a population limiting factor, it is unknown if improved habitat conditions on BLM lands would result in greater elk populations. Greater elk populations would be at the discretion of the CDFG through their CEQA and administrative processes.

Comment 1-55: Determinations concerning the effects of livestock grazing on special status plant species were made by Field Office botanists or other specialists with special status plant program responsibilities. They based these determinations on a variety of sources, including research, monitoring, professional judgement, and consultation with other sources, including the California Natural Diversity Data Base.

Astragalus geyeri var. *geyeri*: This species is negatively impacted through trampling, as noted through three years of personal observation. The plant is an annual plant and occurs on partially stabilized sand dunes. Livestock trampling of the small annual plants in the sand often uproots the plants before they can complete their life cycle.

Astragalus johannis-howellii: This species is negatively impacted by direct herbivory and trampling. Impacts include uprooting of plants and decreases in flower production/seed set post-grazing. This determination was made through personal observation, monitoring, NDDDB, and CNPS Inventory information.

Astragalus monoensis var. *monoensis*: This species is negatively impacted by direct herbivory and trampling. Impacts include uprooting of plants and decreases in flower production/seed set post-grazing. This determination was made through personal observation, monitoring, and NDDB.

Astragalus pseudodanthus: This species is negatively impacted by direct herbivory and trampling. This determination was made through the observations of others, NDDB, and CNPS Inventory.

Calochortus excavatus: This species is negatively impacted by direct herbivory and habitat alteration that has been documented on lands administered by the Los Angeles Department of Water and Power (LADWP), where grazed sites have been invaded by exotic species. The negative effect determination was made through personal observation, monitoring, NDDB, and CNPS Inventory.

Calochortus striatus: This species occurs within an approximately 20 acre parcel which is grazed in trespass. The negative effect determination was made through personal observations and NDDB records. The species is impacted by direct herbivory, trampling, and habitat degradation.

Calochortus westonii: The negative effect determination was made through personal observations, NDDB records, and the observations of Forest Service biologists. This species is impacted by trampling and possible direct herbivory. Probably 95% of this species' distribution occurs on the Sequoia National Forest.

Camissonia benitensis: Expected grazing impacts to this species are negative to neutral to positive. This species is known to occur in one grazing allotment. The grazing management practices on this allotment include year-long grazing with the intensity of grazing restricted to 700 pounds per acre minimum residual mulch left after grazing (prior to the winter rains/green-up). Observations and monitoring of the residual mulch levels on this allotment have shown them to be higher than the minimum 700 lb./ac. level (in fact this year's measurements were 1,378 lbs./ac.). It is expected that grazing at this level would have minimum impact to the survivorship of the species. The species generally prefers open areas and little competition from dense stands of other annual species. Grazing even at the actual levels of use on the allotment could create a mosaic of relatively open areas and approximate the habitat required by the species. The indications of negative impact to the species by grazing is based upon a potential of unauthorized livestock grazing outside of other allotments.

Chlorogalum grandiflorum: This species is negatively impacted by direct herbivory. An unreplicated study of paired transects indicated high levels of utilization of leaf biomass only on the grazed transect.

Clarkia biloba ssp. *australis*: This species was listed as having negative impacts by analogy with other *Clarkia* species with similar life history traits and phenologies. For instance, *Clarkia rostrata* has been observed to have virtually all flowers and seeds removed by grazing in May.

Eriogonum crosbyae: This species is negatively impacted by trampling, as noted through several years of personal observation. The plant occurs on loose, ashy to clay soils that have less than 10% vegetative cover. This plant has been impacted by trampling as livestock

traverse these areas. Young steers tend to roam and climb slopes more so than cows and calves, and appear to cause the majority of the impacts.

Eriogonum temblorense: Although about 60% of this species' distribution is grazed, the negative effects are limited to cattle trailing and are considered to be minor. The negative effect determination was made through personal observations.

Gratiola heterosepala: Habitat of this species is potentially impacted by livestock trampling during its critical reproduction period. This plant grows and flowers at the edge of the waterline in reservoirs and vernal pools. Heavy livestock use during the spring and early summer months could destroy some plants. It is not totally known what influence, either beneficial or detrimental, various intensities of livestock trampling may have on the life cycle of this plant. These determinations have been made through personal observations and some monitoring.

Ivesia aperta var. *aperta*: This species is negatively impacted by herbivory and can also be impacted by soil compaction if grazing is concentrated or occurs when soil is moist. These determinations were made through personal observations and the results of an Interim Management Guide for *Ivesia aperta* var. *aperta* developed by the Plumas National Forest.

Ivesia kingii var. *kingii*: This species is negatively impacted by trampling and habitat alteration. This has been documented on LADWP administered lands where grazed sites have been invaded by exotic species. The uprooting of species is the main grazing effect on public lands. The negative effect determination was made through personal observation, NDDb, and CNPS Inventory.

Lembertia congdonii: This species has both negative and positive effects from grazing. This determination is based on professional judgement and on studies by Taylor (1989), Cypher (1996) and Mazer and Hendrickson (1993). See response to Comment 25-23. This conclusion has been concurred in by USFWS (1992).

Lepidium jaredii spp. *album* (Panoche pepper-grass): This species exhibits both negative and neutral-to-positive effects from grazing. Observations over fourteen years indicate that Panoche pepper-grass abundance is highly variable year-to-year and strongly suggest that the fluctuations in numbers is tied to variation in rainfall and temperature patterns, along with competition from other annual species, and not to grazing pressure. A "pepper-grass year" occurred in the early 1990s when filaree (*Erodium cicutarium*) and pepper-grass were co-dominants, with dominance going markedly to pepper-grass over much of the non-native annual grasslands on BLM lands along the western edge of the San Joaquin Valley. This followed drought years and a grazing history of many years.

While negative effects from grazing at the current grazing pressure would occur in localized areas, the overall regional impact of grazing would be neutral to positive. The localized direct impacts to this species from grazing would be direct mortality when eaten and a decrease in seed production. Since Panoche pepper-grass is an early bloomer, season-of-use would affect the intensity of this impact. Indirect negative impacts may also result from erosion caused by trampling or trailing.

However, cattle do not generally graze the areas where Panoche pepper-grass regularly occurs (i.e., in the less-than-peak years), which is along balds and ridges away from water. It would not be sought in good grass years. Grazing of the annual grasses would reduce thatch build-up

and thus increase the likelihood of successful germination and establishment by Panoche pepper-grass in other localities in the following years. Also, other observers have attributed a general beneficial effect from "terracing" produced by cattle trailing along slope contours, reducing the amount and velocity of run-off down a slope during rainfall. Given these circumstances, grazing would have neutral-to-positive impacts on Panoche pepper-grass.

Loeflingia squarrosa var. *artemisiarum*: This species is negatively impacted by trampling and direct herbivory. This is a very small annual plant that occurs in sandy soils. Intense livestock use and trampling during the spring and early summer months could prevent this plant from completing its life cycle. Since the plant is very small and grows in sandy soils, it is easily disturbed and uprooted. This determination was made through personal observation, the observations of others, and NDDB.

Lomatium congdonii: An unreplicated study of paired transects indicated reduced plant size and reproductive output on the grazed transect.

Lupinus duranii: This species is negatively impacted by direct herbivory and trampling. Impacts include uprooting of plants and decreases in flower production/seed-set post-grazing. The negative effect determination was made through personal observation, monitoring, and the NDDB.

Mimulus shevockii: This species is negatively impacted by trampling, as determined through personal observations. Less than 10% of the distribution of this species is grazed in Caliente Resource Area.

Phacelia monoensis: This species is negatively impacted by trampling and habitat alteration. Invasion by the exotic species, *Polygonum arenastrum* and *Chenopodium album*, may be caused by high nitrogen levels in the soils following cattle use. The negative effect determination was made through personal observation, monitoring, NDDB, and CNPS Inventory.

Ribes tulareense: This species is negatively impacted by minor browsing and some trampling. This determination was made through personal observations. Impacts will be reduced by enforcing the new grazing season and stocking rates that were identified in the final Caliente Resource Management Plan.

Comment 1-56: BLM recognizes that livestock grazing is not the only factor affecting the health of ecosystems. The focus of this EIS is the analysis of the impact of implementing livestock grazing standards and guidelines to ensure improvement in range conditions in the context of administering livestock grazing management.

We agree that implementation of standards and guidelines will only be successful if BLM changes grazing management where domestic livestock grazing has caused resource concerns. We agree also that if grazing management is not the cause of the resource problem, then changing grazing management will not fix the problem. (See the general response to Impacts from Other Programs and Uses.)

Comment 1-57: Implementation of standards and guidelines are expected to improve rangeland conditions. Improved rangeland conditions will result in improved wild horse and burro habitat. It is expected that improved wild horse and burro habitat will result in more rapid

population increases for the reasons stated in the EIS. Assuming an unchanged Appropriate Management Level (AML) in a herd management area that is experiencing improved range conditions and therefore more rapid population increases, populations would be gathered more frequently to maintain the AML. Also, it is noted in the EIS that if improved rangeland health provides a higher level of sustained and reliable forage production in a particular herd management area, a reasonable determination would be to increase the AML for that herd management area. If that were to occur, and the new AML did indeed promote a "thriving natural ecological balance," then it is expected that, so long as the population was managed to maintain that balance, the frequency of gather and removal operations to the wild horses and burros would stabilize.

We have no information upon which to base a quantification of the expected rate of increased population growth due to the implementation of standards and guidelines. Therefore, we are unable to provide a reliable estimate of the increased costs of management. However, we acknowledge that such an increase is possible.

Comment 1-58: See response to 1-50. Comment noted.

Comment 1-59: The anticipated partial reductions are projections only and there are yet no determinations of the magnitude of reduction for any specific allotment or affected permittee/lessee. Most reductions, if needed, are anticipated to be relatively small in proportion to the current authorized grazing use for most operators. However, the DEIS does analyze the impact of partial AUM reductions on individual livestock operations in Chapter 4, pages 36-7. That section notes that many factors are involved in the potential impact on individual livestock operations. The section concludes that in a worse case scenario, it is possible that up to seventeen livestock operators could sell their permit, and/or livestock operation. A reduction in the total livestock inventory cannot always be assumed as each operator has different capabilities for flexibility. As noted in Chapter 4, livestock operators actually used only 67.7 percent of the AUMs authorized in 1996 BLM grazing permits. Non-use in that year totaled 109,962 AUMs.

Comment 1-60: The projected costs of implementation is one reason that Alternative 4 was not selected as the preferred alternative. However, the science recommended in the alternative is supported by the literature, and much of it has been retained in the preferred alternative.

Comment 1-61: See response 1-59.

Comment 1-62: Possessory Interest taxes impacts are presented in Chapter 4, page 30.

Comment 1-63: The permit value discussion on page 30 in Chapter 4 deals with the value of permits as a part of total ranch loan/sale value. The point made is that permit value represents only a small part of the worth of a typical ranch operation. There is no statement or assumption that land development is a viable economic alternative for ranchers. Furthermore, because of the complexity and diversity of ranch economics, it would be impossible to predict the degree that land development would take place as a consequence of any permit change projections in the current analysis.

Comment Letter 2 -- Animal Protection Institute

Comment 2-1 and 2: The BLM does not administer the predator control program. Predator control on the public lands administered by BLM is a function of the USDA Animal and Plant Health Inspection Service, Animal Damage Control (ADC) Division. BLM does coordinate land use concerns with ADC for proposed predator control activities; however, the authority to conduct the program lies entirely with ADC. Predator control is not always for the benefit of livestock operators. Sometimes control projects are implemented specifically to protect specific wildlife populations or to enhance safety and health needs at recreation sites, etc. This topic, therefore, is beyond the scope of this EIS.

Comment 2-3: The horse and African ass were introduced to North America by the Spanish in 1495 during Columbus' second expedition to the New World. Horses and asses were an integral part of Spanish exploration and colonization, and feral populations took hold throughout the Southwest in the 16th and 17th centuries. We are unaware of any estimates of the wild horse populations at the time the first Europeans began to settle.

Ranching communities and lifestyles are well established in many areas of California and Nevada. It was not deemed necessary to provide a complete history of western settlement and the development of ranching to develop rangeland health standards and guidelines for grazing management. It was deemed sufficient to recognize that the lifestyle is changing for a variety of reasons, and to examine whether or how much the standards and guidelines would contribute to those changes.

Comment 2-4: The use of AUM's and real estate value as collateral in loans is discussed in Chapter 4 in the section on Permit and Real Estate Values, page 30. The point made in that section is that permit value represents only a small part of the worth of a typical ranch operation.

Comment 2-5: While the economic benefit of public land grazing is a small part of the national or State of California economy, we disagree that the benefit to local economies is minimal. Modoc County is a case in point and provides an example of a small population and stagnant economy similar to communities scattered across the Intermountain West where the Federal government is a major land owner. In these locations, livestock ranching is not only important economically but also supports the culture and quality of life.

Livestock grazing is a traditional use of public lands that Congress continues to authorize along with its ancillary programs and attendant costs. BLM will continue to manage grazing on public lands until Congress directs us to do otherwise. Establishing standards for rangeland health is an attempt to ensure that this traditional use does not impair the ecological health of the land.

Comment 2-6: The impact of AUM reductions on private land forage and operations is not analyzed because, in the worse case scenario, the reductions represent only 4.8 % of the total public land grazing AUMs in the study area. While some increase in the production of private land forage is possible, the change in public land AUMs is relatively small and there is no reason to conclude there will be large-scale impacts on private land forage operations.

Any indication by BLM in this EIS of impacts to non-public land forage demand due to reductions in grazing on public land would be very speculative and not very meaningful. There are many variables in determining what the actual consequences would be. In some cases

there may be more demand for forage production on non-public lands, but there could also be a decrease in the total number of livestock and therefore no increased demand. Where there may be a reduction in an allotment or portion of an allotment due to implementation of the standards and guidelines, there may be an increase in another. There is no data available on what proportion of alfalfa production is for the exclusive benefit of public land grazing. However, in proportion to other demands for forage products in California (namely dairies, feedlots, horses, and private-land based grazing operations), it is highly unlikely to be significant.

Comment 2-7: Balancing the many uses of public lands is a great challenge faced by BLM. Grazing is a use mandated by Congress, within certain parameters. BLM uses the environmental analysis process prescribed by NEPA to evaluate proposed actions and decisions. There are undoubtedly some areas that would be better ungrazed (from an ecosystem perspective), just as there are some areas that would be better without OHV users, and some wilderness that would be better without hikers. For more perspective on this issue of grazing and other uses see the cumulative impacts section in Chapter 4.

Comment 2-8: The statements regarding wild horse and burro use of riparian areas are based on personal observations of BLM staff. We did not intend to imply that riparian impacts are caused either solely by cattle or solely by wild horses. The intent of this section was to illustrate that should it be determined that the standards are not met in a particular area and that if use by both livestock and wild horses and burros are among the contributing factors to this, BLM has many options for managing the timing and intensity of livestock grazing, while it has relatively few options for managing the timing and intensity of wild horse and burro grazing.

Comment 2-9: We believe that the outline of the wild horse and burro program contained in the EIS is accurate, and that the program complies with pertinent law, regulation and policy. The EIS states that "Generally, BLM monitors environmental indicators and considers this information along with information that it has gathered about impacts caused by other use(s) (principally livestock grazing) and with available information concerning wild horse and burro demographics. These data are periodically analyzed to determine what constitutes an appropriate management level for a given area for a given period. Following this determination, BLM periodically gathers and removes sufficient animals to approximate the current AML for that herd management area." This description reflects determinations by the IBLA that AML's should be based on study and analysis of monitoring information and not on population numbers established in Land Use Plans, if such numbers were established on the basis of "administrative convenience." Table 3.7 indicates which herd management areas have had AML's established following analysis of monitoring information and which have not. We believe that the wild horse and burro management population parameters established in some of the Land Use Plans were based on forage allocations following intensive range survey and therefore had a rational basis for establishment rather than merely being established for "administrative convenience." We recognize, however, that an official determination of whether or not a wild horse and population parameter for a given herd area was established for administrative convenience is within the purview of the IBLA.

Comment 2-10: See response 2-1.

Comment 2-11: Comment noted.

Comment Letter 3 -- State of Nevada, Division of Agriculture

Comment 3-1: The criteria to be used are what actions, to achieve what standards, and through what guidelines, will best result in attaining rangeland health standards, within agency budgetary constraints, and with the least impacts to public land users (including permittees) and to other resource values.

Comment 3-2: Economic impacts of the alternatives is a consideration in selecting a preferred alternative.

Comment Letter 4 -- W.A. Laycock, Professor, University of Wyoming

Comment 4-1: The local RACs in California each wished for their own set of regional guidelines, and have been extremely involved in establishing their original recommendations, and establishing the final preferred alternative. It is difficult to include members of the scientific community on voluntary advisory panels when they do not volunteer or are not nominated by others in the community. However, some members of the RACs, as well as BLM staff, are quite knowledgeable of range science. One of the members of the Susanville RAC, Henricus Jansen, is a Professor of Range Science at Chico State University.

You are correct in your observation that the EIS is a BLM document. While we have consulted with the RACs, numerous individuals, agencies and organizations, BLM has written the analysis and must make the decision.

Comment 4-2: While a standard is as you have defined, Webster also defines it as "something used by general agreement to determine whether or not a thing is as it should be"; or a "level or grade of excellence, attainment, etc., regarded as a goal or measure of adequacy." A guideline is or can be synonymous with a standard, and is indeed defined, again by Webster, as a "standard or principle by which to make a judgment or determine a policy or course of action."

We don't believe that we have redefined the language. Our intent is that Standards be regarded as a goal or measure of adequacy, and that they will indeed be refined at the allotment level. Similarly, we intend that Guidelines be used to make a judgement of a course of action to be taken under certain circumstances to meet that standard or goal.

Comment 4-3: A fundamental is defined by Webster as "a foundation or basis, basic or essential." Rangeland health is defined by the National Research Council (1994) as "the degree to which the integrity of the soil and the ecological processes are sustained." They further state that "these are complex systems that require self-sustaining ecological processes"; and that the "determination of whether a rangeland is healthy, at risk, or unhealthy should be based on the evaluation of . . . degree of soil stability and watershed function, integrity of nutrient cycles and energy flow, and presence of functioning recovery mechanisms. communities." They then go on to further refine how one can determine if these processes are properly functioning.

BLM's first two fundamentals (or essential ingredients) of rangeland health fit quite well within the definition of what is needed (or basic to) a properly functioning or healthy rangeland ecosystem. We agree with your observation that the third and fourth "fundamentals" are merely legal requirements that have nothing to do with rangeland health. However, redefining the

fundamentals of rangeland health as published in the BLM regulations is not within the scope of this EIS.

We respect your opinion, but we have indeed been directed to examine each allotment to see that it conforms to the fundamentals of rangeland health. Using indicators from the National Research Council and those identified in the Standards within this EIS we feel quite able to determine whether sites are meeting or not meeting one or more of the fundamentals.

Comment 4-4: Based upon your comments, we have done a rather thorough review of the scientific literature, and we disagree with most of your comments regarding the use of utilization levels to manage grazing. Utilization has a long and respected history in range management, and much research has been conducted into the proper utilization rates on various types of rangelands. We have prepared an annotated bibliography on this issue. Despite some recent papers criticizing the use of utilization, the evidence is overwhelming that proper attention must be paid to proper utilization or the vigor and production of key forage species will deteriorate. This is true regardless of both season of use and whether grazing systems have been implemented. In addition to the annotated bibliography, please see the expanded discussion of utilization levels in Chapter 3.2.5, the discussion in Appendix 21, and the general responses in Chapter 5.4.1.

We agree that utilization levels are a tool to achieve both rangeland health and desired resource condition objectives. The utilization and residue levels included as guidelines in this document will be amended on a site-specific basis to achieve allotment-specific objectives. We believe, however, that utilization and residue levels must be applied in the interim, particularly to those allotments not meeting the standards. We will monitor both utilization and the attributes associated with rangeland standards and desired future condition objectives.

We disagree with your comment that lighter levels of utilization will not generally speed recovery of a plant community. We have included several references on this topic in the annotated bibliography in the FEIS. While we recognize that some communities, particularly those that most would consider to be in "poor" (early-seral) condition, may have crossed a threshold and reached a new steady-state (*sensu* Westoby et al. 1989 and Laycock 1991) from which they will not recover (Holechek 1991 and Holechek and Stephenson 1983 in the annotated bibliography; other sources cited in Laycock 1994), this by no means applies to all rangeland communities (see Klipple and Bement 1961, Launchbaugh 1967, Potter and Krenetsky 1967, Anderson and Holte 1981, Hughes 1990, Yorks et al. 1992 and 1994, and Hart et al. 1993, for examples of range recovery under light or no grazing; these are all included in the annotated bibliography). Lacey and Van Poolen 1981 examined 20 published grazing studies and found that herbage production was higher in ungrazed areas versus areas subjected to moderate levels of grazing. Your comment certainly does not apply to riparian areas, which, because of the presence of soil water throughout much of the growing season, have the capability to respond relatively rapidly to decreased levels of grazing use (see Platts 1981 for a summary of the effects of different grazing strategies, including no grazing, on riparian and fish habitat).

Comment 4-5: You are correct. We are establishing as standards, or management objectives, the goal of obtaining healthy rangelands. We are using utilization levels as a tool to reach those goals. We also realize that we must monitor our overall efforts to see that we are achieving rangeland health (long-term objectives), and that we must monitor utilization levels (short-term objectives).

Comment 4-6: Comment noted.

Comment 4-7: The BLM wholeheartedly supports the desired plant community (DPC) concept. Proper range management requires that BLM concern itself with both achieving rangeland health and achieving DPC objectives specified in land use plans. The purpose of this EIS is to adopt standards and guidelines that achieve the former. Specific objectives to achieve desired plant communities are developed by Field Offices for specific allotments. The Society for Range Management's Task Group on Unity in Concepts and Terminology (SRM 1995a, and 1995b) recognized the difference between the concepts of meeting standards of rangeland health (which the task group terms the "site conservation threshold") and prescribing and meeting DPC objectives. Some members of the task group originally argued for using only DPC to assess the effectiveness of rangeland management. This argument was rejected on the basis that the DPC is a "moving target" and that a more absolute measure of rangeland health was required (Willoughby, pers. comm. 1997).

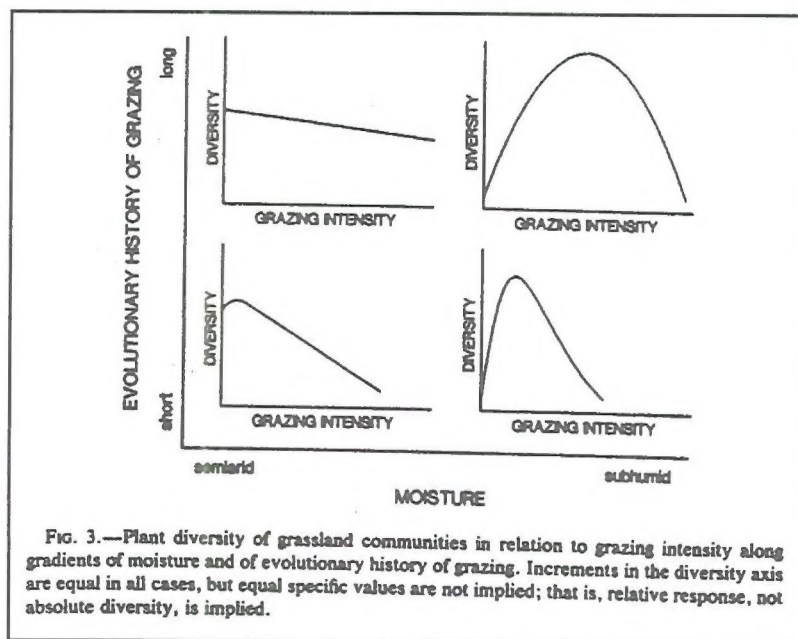


Figure from Milchunas et al. (1998).

seral, and 6% unclassified. We do not agree with your contention that "highest species diversity in a given habitat generally occurs at mid seral (low good to high fair) range conditions." While this appears to be true for relatively mesic grassland communities, it does not hold for semi-arid grasslands like the sagebrush steppe. Figure 3 from Milchunas et al. is reproduced below. After a peak at a relatively low grazing intensity, semi-arid grasslands with a short evolutionary history of grazing, like the sagebrush steppe, lose diversity linearly with increased intensity of grazing (graph at bottom left of Figure 3). Thus, we would expect increases in species diversity to occur for most sagebrush

steppe communities in late to low seral successional stages, except for those communities that have fallen below a threshold from which they will not likely recover (Westoby et al. 1989, Laycock 1991). Ellison (1960) concludes that heavy grazing reduces plant species diversity, while moderate, light, or no grazing tends to increase it, except for some humid Great Plains grasslands where moderate grazing appears to increase diversity over the ungrazed situation.

Comment 4-8: The percentages you give for each seral stage are based on the numbers given in Table 1a (ecological site inventory). To draw conclusions relative to the entire sagebrush steppe vegetation type you need to add the numbers in Table 1b (other inventories and professional judgement). When this is done (and the assumption made that poor = early seral, fair = mid seral, good = late seral, and potential natural community = excellent), the percentages are 5% of acres in potential natural community, 16% in late seral, 49% in mid seral, 24% in early

The effects of livestock grazing on species diversity in riparian areas would be expected to be different due to the more mesic nature of these environments. Based on the relatively few available studies on this subject cited in your paper (Laycock 1994), the effects of grazing appear to be inconclusive -- increasing diversity in some cases while decreasing it or having no effect in others. We believe, however, that the net effect on species diversity in riparian areas from implementation of these standards and guidelines will be an increase. We have many riparian areas which do not currently have the diversity of tree and shrub structure they are capable of supporting. Increasing this structural diversity is expected to increase animal species diversity, particularly for avian species. Although our standard is to manage these riparian areas to achieve an advanced ecological state, we recognize that these systems are dynamic and that natural disturbances from flood events will preclude attainment and maintenance of these advanced ecological states in every riparian area. These natural disturbances will ensure a mosaic of riparian ecological states. Grazing management focused on achieving advanced ecological states will help to ensure that natural disturbance events do not result in moving most of these riparian areas to early successional states.

Comment 4-9: The writer should note that impacts are discussed in chapter 4 not chapter 3.

Comment 4-10: As stated in the introduction, the economic analysis is presented at three levels, regional, county and individual operations. The statement criticized remains true for the regional analysis and in no way "trivializes" the subsequent analysis at the county and ranch operation levels.

Comment 4-11: We have deleted Guideline 14 in the preferred alternative and replaced it with Guideline 16 (see response to comment 1-17). The landscape appearance method is one of the methods described in the Interagency Technical Reference, Utilization Studies and Residual Measurements (BLM et al. 1996b). This technical reference has been endorsed by BLM Cooperative Extension, the Natural Resources and Conservation Service, and the U.S. Forest Service. In the FEIS we have not specified a particular method of measuring utilization. The method will be determined by Field Offices on a site-specific basis.

Comment 4-12: We intend to continue to monitor condition and trend using traditional methods. We also intend to supplement these monitoring studies with studies and assessments that are focused on determining if rangeland health standards are being met. We have added a new monitoring section (Appendix 22). Please refer to that section for more information.

Comment 4-13: Comment noted.

Comment 4-14: We have added the references you cite to the bibliography and have amended Section 3.3.2 (Sagebrush Steppe) and 3.4.2 (Wetland-Riparian Vegetation) to incorporate information in Miller et al. (1994) and Elmore and Kauffman (1994), both of which come from the book, *Ecological Implications of Livestock Herbivory in the West* (Vavra et al. 1994).

Comment 4-15: We have substituted West's (1993) definition of biological diversity for the definition in the Draft EIS.

Comment 4-16: See response 4-3.

Comment 4-17: See response 4-2.

Comment Letter 5 -- Carl Twisselman II

Comment 5-1: The preamble is contained within the preferred alternative.

Comment 5-2: See response 1-22.

Comment 5-3: The involvement of the public in implementation of the standards and guidelines referred to in the sentence you cite includes much more than monitoring. For example, the public may wish to review particular allotment management plans or decisions regarding development and implementation of site-specific guidelines or they may wish to review the results of inventory and monitoring data collected by BLM. Where public access is available, the public is also welcome to accompany and assist BLM personnel in monitoring.

Comment 5-4: As stated in Table A of Alternative 5 for the Bakersfield RAC, stubble height and percent utilization levels are initial values that should be adjusted to consider timing of grazing use and plant phenology, resource conditions and a site's resiliency at the allotment, pasture or site-specific location. Riparian areas to which this guideline will be applied support herbaceous species which in the majority of years will grow to heights far exceeding a 4-6 inch stubble height. Also, because the plants in these riparian areas are dependent on the availability of soil moisture through most of the growing season, they do not invade the drier upland sites.

Comment 5-5: The key area concept has been used to assess the effects of grazing management for many decades (the glossary in the FEIS contains a definition of key area). Key areas need not be "small" but are of necessity smaller than allotments or pastures. Many BLM allotments and pastures are large, with much topographic relief and varying distance from livestock watering sources. Because of this, averaging RDM or other utilization or trend data across these allotments or pastures is inappropriate. Consider an allotment in which half of the area receives little to no use because of steepness and lack of water; the other half receives severe use. If we take utilization measurements over the entire allotment and the average utilization is 40%, this would make it appear that the allotment is within utilization guidelines when in fact half the allotment is overused. The same problem would apply to RDM measurements. Properly placed key areas eliminate this problem.

Comment 5-6: Although claims have been made for the positive effects of hoof action by livestock, none of the experimental studies to date have demonstrated any positive effects, although some studies have shown that livestock grazing at certain levels has negligible effects compared to the ungrazed areas. See summaries of this issue and citations in Holechek et al. (1998:420-427) and Vallentine (1990:47-54).

The effects of dung and urine on rangelands are poorly understood, but it appears that the effects are minor except where animals congregate (Heady 1975). With a stocking rate of one cow per 4 hectares, it is estimated that 7-8 percent of the grazed area would be affected each year by the deposit of dung and urine (Heady 1975). Thus, 7-8 percent of the grazed area would be enriched in terms of nutrients such as nitrogen, calcium, phosphorus, and potassium. This enrichment comes at the expense of the rest of the grazed area. The nutrient enrichment in livestock concentration areas is not necessarily a good thing. Although the added nutrients,

especially nitrogen, are likely to increase total production (e.g., Rossiter 1966), they also affect the species composition of the site. For example, nitrogen is known to stimulate the growth of grass species at the expense of clover species (Rossiter 1966). Since this appears to be related to increased shading effects from taller grass plants, it is likely that these grasses will out-compete other forbs in addition to clover in the presence of increased nutrients. In the annual grassland, this can lead to dominance by introduced annual grasses in livestock concentration areas and decreased biodiversity. In the sagebrush steppe, it has been shown that fertilization may increase the vigor, yield, and seed production of bluebunch wheatgrass in the absence of cheatgrass, but where the latter species is present, both bluebunch wheatgrass and Idaho fescue yields are reduced with fertilization (Miller et al. 1986). Thus, in the presence of cheatgrass, the added nutrients from manure in livestock concentration areas would be expected to encourage the alien cheatgrass at the expense of native perennial grasses. McLendon and Redente (1991) studied the effects of fertilizing versus not fertilizing a disturbed steppe community and found that the addition of nitrogen resulted in greater and longer dominance by introduced annuals compared with the control. This study, too, strongly suggests that the nitrogen contributed by manure would encourage introduced species at the expense of native perennial species in livestock concentration areas.

Comment 5-7: There is debate over the actual species composition of the area currently dominated by Mediterranean annual grasses, particularly in the southern San Joaquin Valley (see the comments of Dr. Paula Schiffman, Comment Letter No. 26, on this issue). Wester (1981) reviewed early accounts of Spanish and Anglo-Americans and concluded that, except for the Sierra Nevada foothills, in many places in the Coast Ranges and "in some localized, well-watered floodplains in the interior," most of the San Joaquin Valley was not dominated by perennial bunchgrasses, such as purple needlegrass (*Nassella pulchra*), nodding needlegrass (*N. cernua*), and one-sided bluegrass (*Poa secunda* ssp. *secunda*) as is thought by many experts, including those referenced in the DEIS. Although their former dominance may be debatable, there is no denying the presence of all three of these species, as well as other species of native perennial grass, in areas of the southern San Joaquin Valley and the Carrizo Plain, indicating that they can, in fact, tolerate conditions of low rainfall. It is unlikely the debate over the composition of the pristine grasslands of California will ever be completely resolved.

Comment 5-8: It is the opinion of BLM rangeland managers that cattle will in fact graze saltbush seedlings, if only for the fact that they are unable to select out the other herbaceous forage from the intermingled saltbush seedlings. The standards for episodic recruitment would only need to be implemented during relatively rare periods. Thus, any increased risk from fire to mature saltbush would be short-lived (during the one- to few-year period that grazing is excluded or restricted to give saltbush seedlings a chance to become established).

Comment 5-9: BLM and Forest Service program costs for 1993 were calculated at \$94,036,000. Dividing that total by the total number of AUMs authorized by the two agencies produced the average cost per AUM of \$5.76. The 1990 Farm Costs and Returns Survey of western livestock operations concluded that the grazing permit fee represented 3% of the total cash costs expended by the livestock operators. The study is detailed in the Rangeland Reform DEIS, Chapter 3, pages 3-69 and 3-70.

Comment 5-10: Because the California statewide average is not applicable to all parts of the state, nor to Nevada, it was not the figure used in the impact analysis detailed in Chapter 4. Page 30 of that chapter points out that ranch values have increased an average of 3% per year over the last decade. The increased value of land is a very important economic factor in

ranching and local community economics. That section also points out that increasing land values are also a more important variable than the grazing permit value.

Comment 5-11: Normal total costs for fence construction are close to \$5000 per mile. However, the cost estimate used in the Draft EIS included reduced labor cost opportunities such as the use of state inmate crews or shared labor furnished by ranchers. These practices have often been used in the past and will be used in the future to help reduce overall fencing costs.

Comment Letter 6 -- Lahontan Regional Water Quality Control Board

Comment 6-1: This was recognized in the Draft EIS; and the preferred alternative specifically addresses the need and means to meet State water quality standards.

Comment 6-2: See response to 6-1.

Comment 6-3: See response to 6-1.

Comment 6-4: BLM fully recognizes that the application of BMPs does not in itself ensure that water quality standards will be met. BMPs where properly applied, however, should help minimize the potential for nonpoint pollution occurrences. Site-specific management prescriptions may still need to be applied to correct or prevent pollution to particular water bodies.

Comment Letter 7 -- Bill Phillips

Comment 7-1: The RAC was aware of your comment, but did not chose to change the wording.

Comment 7-2: Icing is reduced because of the insulating and snow trapping effects of riparian vegetation (Kattleman and Embury 1996). Also, the lack of riparian vegetation to stabilize the banks in many cases allows the stream to widen and become more shallow, and therefore it will freeze more easily.

Comment 7-3: It is true that achievement of potential natural vegetation (PNV) may take a very long time in some arid upland areas; and some depleted areas may have reached a stable state from which they will never recover without large mechanical inputs (Laycock 1991). Note, however, that the guideline states that grazing should be managed to achieve the PNV or the desired plant community. For those areas for which achievement of PNV is unlikely in timeframes relevant to management (or for which PNV will not meet management objectives), desired plant communities may be prescribed that are achievable in shorter time periods.

Comment 7-4: The preferred alternative in the Final EIS has eliminated Guideline 14 and replaced it with Guideline 16.

Comment 7-5: Fencing of springs and seeps is a management tool to meet the riparian standard or particular management objectives. These sites will be fenced as necessary. We do not anticipate that all sites will be protected in this manner.

Comment 7-6: This guideline addresses loss of wetlands as an indicator to adjust grazing permits when trampling is a cause of riparian problems.

Comment 7-7: Utilization levels will be determined based on measurements of the mean utilization in key areas (see new guidelines in Alternative 5 for all 3 RAC areas on how utilization levels will be used in implementation). To the maximum extent possible, utilization will be based upon the total annual growth.

Comment 7-8: See response to comment 1-17, and 7-4.

Comment Letter 8 -- Tulare County Board of Supervisors

Comment 8-1: Comment noted.

Comment Letter 9 -- Bob Wilson

Comment 9-1: BLM considers wildlife use of forage when evaluating rangeland condition and trend. When appropriate, BLM works with CDFG to balance wildlife population objectives and harvest management with available habitat/forage. In this manner, wildlife can be removed when they cause habitat problems. Also, these guidelines only apply to grazing management. See the general response to impacts from other programs and uses in section 5.4.1.

Comment 9-2: Alternative 4 was not selected as the preferred alternative.

Comment 9-3: See response to comment 1-4.

Comment 9-4: Field Offices keep a file on each allotment that documents past grazing management, range improvements, management changes implemented, and monitoring. As we have done, BLM will continue to document past management practices, as well as the conditions and trends of vegetative communities on the public rangelands, using our approved monitoring protocol.

Comment 9-5: We have read Mr. McKinney's paper and have included it in the Annotated Bibliography. See also the expanded discussion of utilization levels in Chapter 3.2.5, and Appendix 21.

Comment 9-6: We agree that regardless of which alternative is selected, experience and professional knowledge will be required to properly implement the standards and guidelines.

Comment Letter 10 -- California Trout

Comment 10-1: We agree that standards must be measurable to the degree that we can determine whether we are meeting a standard or not. It is not true, however, that the measures always need to be quantifiable. There are some attributes of the standards that are quite meaningful, yet not quantifiable. For example, one indicator used to support the riparian standard for the area covered by the Bakersfield RAC is that "plant species present indicate that soil moisture characteristics are being maintained." This can be measured by visiting a site

and seeing whether obligate wetland-dependent species are present or not. There is no need to count how many of each of these species is present -- if soil moisture characteristics are not being maintained, the species will not be present at all.

Many of the other indicators will be assessed using qualitative procedures (see Appendix 22) applied by an interdisciplinary team. We believe that those indicators obviously not meeting the standards can be adequately measured this way. Once management changes have been implemented to move these indicators toward meeting the standards, quantitative monitoring of these indicators can be initiated.

Where appropriate, we have added quantifiable measurements to some of the guidelines to help us determine management thresholds for rangeland health. These are reflected in the preferred alternative.

Comment 10-2: We have added more specific time frames for implementation. See Appendix 21.

Comment 10-3: Monitoring to assess the effects of management actions will be initiated immediately. In many cases this monitoring will continue already existing monitoring that has been in place for many years. In other cases, new monitoring will have to be initiated. Intensity and frequency of monitoring will vary depending upon allotment priority. For a full discussion of monitoring, see Appendix 22.

Comment 10-4: The fallback standards and guidelines are in effect now. When approved, the standards and guidelines developed through this process will go into effect. See Appendix 21 for our proposed implementation schedule.

Comment 10-5: We agree that Alternative 4 would bring about the fastest improvement in rangeland health conditions. We did not select it as the preferred alternative, however, because the resources required to implement it are not available, and therefore the alternative is not achievable. We believe the preferred alternative will produce the same results, although not as fast, but also with fewer negative economic impacts.

Comment 10-6: See responses 10-1, 2, 3.

Comment 10-7: The regulations (43 CFR 4100) provide that permittees/lessees must adhere to the terms and conditions that are included within their permit or lease. Enforcement avenues will vary depending upon the nature and seriousness of the violation, and could include warnings, trespass charges, modified terms and conditions (usually stricter), or cancellation of the permit or lease. Some violations can also result in criminal penalties. Since the types of requirements are identified in the regulations and there are many other requirements unrelated to rangeland health standards and guidelines that each permittee/lessee is responsible to know, we have not included these in the document.

Comment 10-8: See response 10-1. This document is establishing standards and guidelines for a tremendously varied area of California and NW Nevada. The goal is to establish standards that will apply to the entire area. They must therefore be general in nature; it is expected that in many cases they will be refined for site specific application.

As an example, an "appropriate amount" of ground cover would be the amount of cover or litter/residual dry matter present on a particular ecological site which preserves soil stability and watershed function. Soil stability means that the soil surface is protected from "accelerated" erosion and water enters the soil (infiltration) at rates appropriate for the soil type (the term "accelerated" means that the erosion rate exceeds natural, geologic rates for the site). Appropriate amounts is a relative term used in reference to a site which represents natural healthy, fully functioning watershed condition. Measurement criteria would include the amount and distribution of litter, amount of bare soil surface, presence or absence of erosional features which indicate runoff, and plant vigor as an indicator of site fertility. The specific "appropriate amount" will vary depending upon the topography, climate, soil type, vegetative type, etc.

Comment 10-9: See responses 10-1, 2, 3.

Comment 10-10: See response 10-5.

Comment 10-11: We have rewritten this section to eliminate this misunderstanding.

Comment 10-12: See responses 10-2 and 3.

Comment 10-13: See response 10-8.

Comment 10-14: BLM has the responsibility to protect water quality from degradation caused by activities for which BLM is responsible, so that the beneficial uses of that water (as identified in the Basin plans) may be realized. Under normal circumstances, livestock grazing, is considered a nonpoint source use under the Clean Water Act and does not require specific certification or site-specific monitoring of water quality unless there is known impairment or a threat of impairment to a water body from livestock grazing activities. BLM has and will continue to participate with the Regional Water Quality Control Boards in conducting water quality measurements where these situations occur.

Comment 10-15: See response 10-8.

Comment 10-16: See responses 10-1 and 8.

Comment 10-17: See response 10-14.

Comment 10-18: No, this does not mean that a minimum riparian zone will be established with little or no management.

Comment 10-19: See response 10-14.

Comment 10-20: We do not agree with this statement. There are many examples where properly managed livestock grazing is compatible with sustaining the health of aquatic systems.

Comment 10-21: See response 10-14.

Comment 10-22: We have reviewed these articles. In addition to retaining Guideline 1, we have added Guideline 16, which prescribes stubble heights of 4-6 inches on those allotments not meeting the standards (until site-specific guidelines are developed -- see Alternative 5, Susanville RAC Guideline 16 for more information).

Comment 10-23: To be classified as being in PNC, a community must be 76% or more similar to what has been described as the PNC for the site (see Table 3.3.3). We believe this is achievable under properly managed grazing for most riparian sites. As you rightly indicate, defining PNC is not an easy task, and PNCs have not been described for many riparian ecological sites (unlike the situation for upland ecological sites, where site descriptions developed by the Natural Resources Conservation Service are available for most sites). It will be up to local BLM rangeland managers to determine PNCs to the best of their ability.

Comment 10-24: See responses 10-1 and 8.

Comment 10-25: See response 10-20.

Comment 10-26: BLM is required to inventory areas for special status species before taking any actions that might impact those species. It is our intent to continue to conduct inventories of such areas prior to taking or authorizing any actions that might impact any special status species within an area.

Comment 10-27: We agree with you. The preferred alternative eliminates this guideline, and includes a new Guideline 16 which prescribes utilization levels of 30-40% on key sagebrush-grassland species and 20% utilization on key riparian tree and shrub species for those allotments not meeting the standards (until site-specific guidelines are developed). Also see general response on utilization in Chapter 5 section 5.4.1, Appendix 20, and the annotated bibliography on utilization.

Comment 10-28: It would take just as much time to implement guideline 14 as it would to implement the guidelines being developed through this process; and, as you point out, guideline 14 would not result in improving the resources. Additionally, there are a great number of allotment plans that already have utilization level guidelines and other management prescriptions that, where being followed, are enhancing rangeland health. As an example, those allotments included as Category 2 in Appendix 21 have already met the standards or are making significant progress towards meeting the standards, and much of that success can be attributed to adhering specifically to the terms of the existing plans.

Comment 10-29: The standard for all riparian areas should be properly functioning condition (PFC). The goal is to have all areas not at PFC in an upward trend. We realize that this is not yet the case, and that there is still inventory work to be completed, as well as actual work on the riparian areas. Regarding Alternative 4, see response 10-5.

Comment 10-30: The case you refer to regarding 401 certification requirements for grazing is still in litigation, and therefore no final conclusions can be made to its potential applicability to other such situations.

BLM as a matter of practice applies what it determines to be the best management practices (BMPs) for all site-specific situations where we need to protect water quality. What we have not yet completed is a formal identification of the BMPs or types of BMP actions to protect water quality from grazing activities for formal approval by the States and EPA. Appendices 9 and 10 contain a listing of proposed BMPs that we intend to use to fulfill that mandate.

Comment 10-31: See response 10-7.

Comment 10-32: See Appendix 23, which contains a discussion of what PFC is and does.

Comment 10-33: Non-consumptive uses have economic value, but an economic impact analysis was not possible. Such an analysis would have required qualification of habitat changes and associated wildlife population changes. That type of analysis is inappropriate for a programmatic EIS and is impossible given the broad geographic area with diverse ecosystems represented in the EIS study area. Such site specific analysis may be possible in subsequent Allotment Management Plan decisions.

Comment 10-34: See response 10-11.

Comment 10-35: See the general response to the wilderness issue in this chapter, section 5.4.1.

Comment 10-36: These allotments are infested with Medusahead, an exotic annual that is extremely difficult to eradicate. To determine whether complete exclusion from grazing will help restore conditions or keep conditions from further deteriorating will require a site-specific evaluation of the conditions and current grazing practices. In some cases, provisions to minimize access by livestock during wet soil conditions or some other management prescription may be sufficient; in other cases it may not. See also the response to comment 34-57.

Comment 10-37: From a livestock grazing standpoint, the critical period of establishment is the time between germination and the point at which the plants have reached a stage in their growth that they will not be adversely impacted by livestock grazing. This varies by species and is also weather dependent: seedlings may not survive into the second year simply because weather conditions are unfavorable, regardless of the grazing regime. Our goal is to give the seedlings of these important, long-lived species the best chance possible for survival.

Comment 10-38: The PFC analysis does not refer to biological health, only to physical health. See Appendix 23 for a discussion of PFC.

Comment 10-39: This assumption has been eliminated in the FEIS.

Comment 10-40: Comment noted.

Comment 10-41: Comment noted, we concur.

Comment 10-42: See general wilderness response in this chapter, section 5.4.1.

Comment 10-43: The economic gain to local economies in the rapid recovery alternative could not be estimated for a number of reasons including the absence of quantified habitat and wildlife data as noted in response 10-33. Furthermore, it could not be assumed that incremental improvements in the natural resources would result in dollar benefits to local communities such as through increased tourism. Many non-natural resource variables (e.g., distances to population concentrations, market competition, existing infrastructure and financial capability, etc.) are involved in tourism industry economics. It is likely that the relatively low benefit of tourism to Modoc County is due more to the latter variables than to the quality of the area environment.

Fragmentation of land ownership in many grazing allotments is a factor that makes fencing necessary to protect the resources from activities on adjacent non-public lands.

Comment 10-44: Comment noted, we concur.

Comment 10-45: See response 10-13.

Comment 10-46: See response 10-2.

Comment 10-47: Comment noted.

Comment 10-48: See response 10-33.

Comment 10-49: See response 10-5.

Comment Letter 11 -- Jerry Holechek, Professor, New Mexico State University

Comment 11-1: We agree with you that residues are one of the best attributes to manage in achieving rangeland health. Guidelines for annual rangelands and herbaceous riparian vegetation are framed in terms of residue (pounds per acre for annual rangelands and stubble heights for herbaceous riparian vegetation). Because research on stubble heights and residue for upland perennial grasslands is limited (but thank you for providing to us much of the research that is available), we are continuing to frame guidelines in terms of utilization levels (see the explanation in the general response on utilization and residue levels in this chapter, section 5.4.1; and a fuller explanation in Appendix 20). We do, however, intend to conduct studies over the next few years that will enable us to shift from utilization levels to stubble heights and residue levels. We have adopted your suggestion on implementation of residue and utilization guidelines with a slight modification. Instead of allowing permittees to exceed the guidelines in 3 out of 10 years as you propose, we are allowing them to exceed the guidelines in 2 out of 5 years.

Comment 11-2: We have incorporated your suggestions into the preferred alternative.

Comment 11-3: This has been done. See response 11-1.

Comment 11-4: See comment 4-2. These are defined for us in the regulations, and it is not our option to change them. Our goal or objective is healthy rangelands.

Comment 11-5: See the response to comment 4-12 and the new monitoring discussion in Appendix 22. We too feel that soil vegetation cover (including both live and dead vegetation) is an important indicator of rangeland health.

Comment 11-6: See comment 4-2.

Comment 11-7: See comment 4-1.

Comment 11-8: The RACs are to advise the BLM manager regarding the preparation, amendment, and implementation of land use plans and resources within its area. BLM was directed to consult with the RACs in developing Standards and Guidelines that will meet the

fundamentals of rangeland health as described in the regulations. In this case, the RACs worked with BLM and actually developed Standards and Guidelines which they recommended to BLM (Alternative 1).

Comment 11-9: The title of that section has been changed.

Comment 11-10: Comment noted, we concur. See comment 4-2.

Comment 11-11: Comment noted. Reference added.

Comment 11-12: See response to comment 4-11.

Comment 11-13: We agree with assessment of the key area/key species approach and will continue to use it in monitoring rangelands in California.

Comment 11-14: See response 11-1.

Comment 11-15: We agree that more progress can and should be made toward improving ecological condition on sagebrush steppe rangelands. By implementing standards and guidelines, as well as site-specific desired plant community objectives, we hope to move toward later seral stages on more of our rangelands. Given the fact that about 25% of our sagebrush steppe rangelands are in low seral ecological condition (this figure combines Tables 1a and 1b of Appendix 7) and may have reached a stable state from which they will not recover, your goal of 50-60% does seem reasonable.

Comment 11-16: Yes, this is a valid source of contributed funding. Environmental groups have participated in the past with fencing as well as other restoration projects, both monetarily and with actual labor and monitoring.

Comment 11-17: Grazing systems, including rest-rotation and deferred rotation, can help riparian recovery, but only if the systems include measures necessary to protect and enhance riparian conditions, such as ample cover and height of vegetation, ample rest from grazing for vigor and reproductive needs of the desired plants and minimal soil disturbance from trampling by livestock. Traditional rest-rotation and deferred systems, however, as a rule, have not been successful in restoring riparian areas due to heavy utilization levels and concentrated trampling activities which commonly occur, even if only for short periods of time. Riparian improvement needs must be included in the design of any grazing system in order to achieve the desired results.

Comment 11-18: Chapter 3 has been changed.

Comment 11-19: These tables are Appendices 11 and 12.

Comment 11-20: No information on net returns per animal unit or per grazing acre are available. But it is very clear that net return will vary a great deal in different years. The 1996 Nevada Agricultural Statistics Report states that net farm income in the state was 91 million dollars in 1993 and 39.4 million dollars in 1995. Farm income declined and total production expenses increased.

Comment 11-21: We have included a discussion in Chapter 4 concerning the probability of reinstating increased grazing capacity based upon determinations of a sustainable increase in forage production capacity. BLM cannot guarantee that increased capacities will occur in all cases.

Comment 11-22: This AUM total was based upon adding broad projections from the field offices of possible estimated reductions that could possibly occur in order to restore resource conditions under the various alternatives. These numbers were intended to be used for analysis purposes only, with the understanding that these AUM totals are hypothetical. Actual numbers will not be known until site-specific evaluations are completed for implementing the standards and guidelines.

Comment 11-23: See response 11-21. BLM does not have an authorized means of compensating ranchers for AUMs lost.

Comment 11-24: See response 4-1.

Comment 11-25: We have added a new section on monitoring to the Final EIS (see Appendix 22).

Comment Letters 12 -- Modoc County Board of Supervisors (Two letters)

Comment 12.1-1: Comment noted. Guideline 14 has been deleted from the preferred alternative and replaced with Guideline 16.

Comment 12.1-2: Yes, research based economic multipliers were used. The specifics are presented in Appendix 17, "Explanation of Economic Analysis Methodology."

Comment 12.1-3: The Closing Comments to the Economic Impact Analysis states on page 37 that, "The vast majority of the AUM reduction impacts will occur... in Modoc and Lassen counties. ... County government revenues are not expected to be noticeably impacted. A majority of the Washoe County income loss would affect Modoc County and the cumulative effect could be intensified in Modoc's small and economically undiversified rural economy."

Comment 12.1-4: Implementation will be done upon a priority basis. See Appendix 21.

Comment 12.1-5: Such situations would require site-specific evaluation. If, using your example, juniper encroachment was not caused by grazing and the situation would not be corrected by reductions of livestock, there might be no livestock reduction. However, if the encroachment has resulted in a reduction of available forage so that the remaining forage is being overgrazed, then there might be a reduction.

Comment 12.2-1: Comment noted. This alternative, with some changes (Alternative 5) has been selected as the preferred alternative.

Comment 12.2-2: Guideline 14 has been deleted from the preferred alternative and replaced with Guideline 16.

Comment Letter 13 -- Craig Dremann, The Reveg Edge

Comment 13-1: Comment noted. Specific responses follow specific comments.

Comment 13-2: We agree that the genetic diversity of the plant species on BLM lands has not been mapped or measured by BLM. While we appreciate the importance of genetic diversity, particularly when related to the conservation of special status species and revegetation efforts, we have never had the budget to conduct research into this issue. The U.S. Forest Service has conducted considerable research into the genetic diversity of tree species because of past unsuccessful efforts in reforestation due to the use of genotypes that were inappropriate for the particular areas in which they were used. This, coupled with the economic importance of these species, led to research data which both the Forest Service and BLM have used in forest management. The genetic diversity of rangeland plant species has not, unfortunately, received similar attention. Because we have not investigated this issue, we cannot report on it in the EIS.

Comment 13-3: Rangeland health assessments, along with the monitoring of condition, trend, and utilization, will allow BLM to make decisions on priority allotments within one to a few years, not the 15 years you cite. We recognize that the vegetation of large areas of the EIS area has been drastically changed from its presettlement state (see discussion of annual grasslands and sagebrush steppe in Chapter 3, Section 3.3.2), although there is debate over the actual composition of the presettlement annual grasslands (see the comments of Dr. Paula Schiffman, Comment Letter No. 26, and the response to comment 5-7). While many of these changes were certainly the result of past livestock grazing (most of the changes took place before the turn of the century), this does not mean that current grazing practices are incompatible. BLM has ongoing research into this issue in the Carrizo Plain and the southern San Joaquin Valley.

Comment 13-4: See response 10-7.

Comment 13-5: The Taylor Grazing Act and the Federal Land Policy and Management Act (FLPMA) provide the authority and direction to BLM to allow and manage livestock grazing on public rangelands determined to be available for that use. Livestock grazing is considered by Congress to be a valid use of public lands as long as it is, like other multiple-uses, in harmony with resource values and policies governing the management of those lands. Cost effectiveness, or perceived lack thereof, is not a consideration that BLM is allowed to use to determine whether to allow or not allow grazing.

We do have the responsibility, however, to determine where and when grazing is compatible with sustaining or enhancing the health of rangelands and the other values and land use needs of the public lands, and that is the primary purpose of this effort. We feel the EIS is adequate to help determine anticipated consequences of the standards and guidelines under the varying alternatives, and their potential for enhancing rangeland health conditions. The purpose of this effort is not to determine if livestock grazing is to occur or not, but rather to determine that where it does occur, how best can it sustain or enhance the fundamentals of rangeland health.

Comment 13-6: The purpose of this EIS effort is to develop standards for rangeland health and guidelines for grazing management, and how we might best manage livestock grazing. These other topics are outside the scope of this effort.

Comment 13-7: See response 13-5.

Comment 13-8: NEPA requires that agencies use the best available data to make decisions, not that they postpone decisions until all potential data is developed. We believe that we have sufficient, accurate data to select the best standards and guidelines at this time; but also recognize that these standards and guidelines may need revision in the future to meet changing conditions or site-specific needs. One of the reasons for adopting standards is to implement monitoring that will assess whether they are being met. See the new monitoring section (Appendix 22) for information on the kinds of monitoring that will be conducted.

Comment 13-9: See response 13-6.

Comment 13-10: See response 13-8. Less than 1.3 million acres of the 4.4 million acres have been inventoried using the Ecological Site Inventory (ESI) method. That does not mean that no information exists for the remaining 3.1 million acres. We have information on most of these areas from other inventories, from monitoring, and from professional judgement. As noted in the Draft EIS, even the ESI method is inadequate to assess whether some of the standards are being met. For that reason we will incorporate new assessments and monitoring into our operations (see Appendix 22).

Concerning infrastructure, the different standards include numerous indicators of ecosystem function, and require that healthy, productive and diverse populations of native species be maintained. These concerns have been addressed throughout the document.

Comment 13-11: Comment noted. See response 13-6.

Comment 13-12: Comment noted. See response 13-6.

Comment 13-13: Much of the damage to perennial grasslands from grazing was the result of unregulated grazing prior to the passage of the Taylor Grazing Act of 1934. We agree, however, that we should manage these grasslands to improve their condition and sustain them for future generations (to maintain the "infrastructure"). We believe that implementing the standards and guidelines will accomplish this.

Comment 13-14: We believe we can make this determination for most of the rangelands we manage, although we recognize there are some allotments for which we cannot (these are mostly allotments consisting of small, scattered parcels of BLM lands within much larger, privately owned rangelands). New monitoring will be put into place to assess whether we are meeting standards.

Comment 13-15: See response 13-6.

Comment 13-16: BLM's grazing program, and the licensing and transfer of leases and permits, is authorized and directed by Congress through the Taylor Grazing Act and FLPMA. See response 13-6.

Comment 13-17: Comment noted. See response 13-6.

Comment 13-18: Comment noted.

Comment 13-19: Comment noted.

Comment 13-20: See response 13-10. Grazing allotment files are public documents. You are welcome to visit our Field Offices and inspect any particular file at almost any time.

Comment 13-21: We disagree that the characteristics used to determine rangeland health only relate to use for livestock grazing. On the contrary, the standards relate to basic ecological processes including nutrient cycling, as well as the species diversity, water quality, and the reduction of exotic weeds.

Comment 13-22: Without citing specific examples so that we fully understand your concern, we cannot respond.

Comment 13-23: Without citing specific examples so that we fully understand your concern, we cannot respond.

Comment 13-24: The Draft EIS does, in fact, discuss the impacts of livestock grazing on perennial native grassland communities. Please see Chapter 3, Section 3.3.2. The entire point of the EIS is to establish standards and guidelines that will improve rangeland health. However, the specific plant community and seral stage desired in any given area will be determined through the regular land use process, not in this EIS.

Comment 13-25: See response 13-6.

Comment 13-26: Chapter 3 and 4 identify and discuss the known environmental consequences of livestock grazing.

Comment 13-27: See responses 10-8, and 13-10, 13, 14 and 24.

Comment 13-28: See response 13-16.

Comment 13-29: We believe that we have adequate authority to protect the resources. However, without citing specific examples so that we fully understand your concern, we cannot respond.

Comment 13-30: A cumulative impact section has been added to this Final EIS. See response 13-6.

Comment 13-31: See response 10-7.

Comment 13-32: See comment 13-30 dealing with cumulative impacts. It is outside the scope and purpose of this EIS to evaluate information at the site-specific level.

Comment 13-33: We disagree. See response 10-7.

Comment 13-34: See the implementation plan, Appendix 21.

Comment 13-35: Native species are always given first consideration in revegetation projects, as outlined in BLM's Policy on the Use of Native Plant Materials in California (IM No. CA-97-34). There are, however, certain situations where non-natives may be desired, such as highly disturbed sites that have had their physical characteristics altered so that native vegetation can no longer survive. In these cases justification must be submitted for approval by the State Director prior to using non-natives.

Comment 13-36: BLM is using a priority approach, working first on known problems. See the Implementation Plan in Appendix 21 for a description of this approach.

Comment 13-37: We disagree that the DEIS is inadequate, although there were indeed some errors. We realize that we did not have a complete data set for every acre; but we also believe that such data is not necessary to accomplish the development of standards and guidelines that, when implemented, will result in improving rangeland health.

Comment 13-38: We disagree. See comment responses 13-5 and 6.

Comment Letter 14 -- Mattole Landowners for Sensible Watershed Management

Comment 14-1: All decisions will be made on a site-by-site basis through discussions with all affected and interested parties. There are no plans to abolish any leases in the King Range.

Comment 14-2: Your concern is noted. With the recent listing of steelhead, there may be increased scrutiny of grazing in some areas to ensure that habitat is protected.

Comment Letter 15 -- Jack Booth

Comment 15-1: See response 10-33, and the recreation impact analysis.

Comment 15-2: Diversity and viability of wildlife populations was added as an indicator to the Susanville Biodiversity standard to address this concern.

Comment 15-3: We agree that Alternative 4 would bring about the fastest improvement in rangeland health conditions. We did not select it as the preferred alternative, however, because the resources required to implement it are not available, and therefore the alternative is not achievable. We believe the preferred alternative will produce the same results, although not as fast, but also with fewer negative economic impacts.

Comment 15-4: The preferred alternative changes the Susanville standard to meet this need.

Comment 15-5: The preferred alternative prescribes stubble height guidelines for riparian areas on those allotments not meeting the standards. Until additional information is gathered concerning appropriate stubble heights for upland perennial species, utilization guidelines are prescribed for these species on allotments not meeting the standards. Field Offices will amend the stubble height and utilization guidelines given in the Final EIS to apply to specific allotments; these site-specific guidelines will be applied both to meet the standards and to meet allotment-specific objectives relative to desired future condition.

Comment 15-6: BLM will make the decisions. A major purpose of developing the standards and guidelines is to clarify the management goals on the public lands so that they will be in good health and proper functioning condition.

Comment 15-7: Evidence indicates that bitterbrush can maintain itself at up to 60-65% utilization (Garrison 1953), so 50% total use on this species should not be too much. Of more concern is whether sufficient amounts of the current year's growth of this species is available for mule deer use in fall and winter. For this reason we also have a requirement that there will be no more than 20 percent utilization of annual growth on key browse species prior to October 1 within identified deer concentration areas.

Comment 15-8: We have made the note in Appendix 12. The BLM will conserve the habitats for listed species when they occur on BLM lands as required under the ESA. The BLM will also contribute to the recovery of listed species through reintroductions onto BLM lands or other management actions to improve habitats when identified in FWS recovery plans and actions are within BLM capability.

Comment 15-9: We agree that healthy, productive and diverse wildlife populations are an economic asset to the economy. We believe that our analysis fully considered those values, and that the preferred alternative, when implemented, will achieve that goal.

Comment Letter 16 -- Natural Resources Defense Council and California Native Plant Society

Comments 16-1, 2, 3, 4: See the general response to Process questions in this chapter, Section 5.4.1.

Comment 16-5: When detailed information is not available or is not feasible to obtain for timely decisions, professional judgement is acceptable and remains as the only valid option. Detailed "scientific" information often is not necessarily any more immune from challenge than professional judgement (see comment letters 4 and 11); however, we only use professional judgement where detailed information is unavailable and a determination has to be made.

A more detailed implementation plan is included in the Final EIS as Appendix 21.

Comment 16-6: We recognize that there is a need for detailed standards and guidelines that will be applied on a site-specific basis. However, the requirement is to produce regional or state-wide standards and guidelines to be applied over an extremely varied (climatic, topographic, soil type, vegetative type, etc.) area. For that reason, we have incorporated utilization levels and stubble heights into the preferred alternative that we believe will, when implemented on areas not meeting the standards, result in making significant progress toward meeting the standards until more site-specific guidelines can be developed to meet those local conditions.

Comment 16-7: Based upon our review of the literature (see the Annotated Bibliography on Utilization, and the discussion in Appendix 20) we have adopted the more conservative utilization and stubble height levels of Alternative 4 in the preferred alternative, and will apply these to allotments that are not meeting the standards. Field Offices will adapt these guidelines as necessary to meet both the standards for rangeland health as well as site-specific objectives

developed to achieve desired plant communities. The literature does indeed show that light to moderate use levels result in greater economic returns to livestock operators.

Comment 16-8: The preferred alternative includes utilization limits on key riparian trees and shrubs (no more than 20% utilization in those areas where the presence of woody species is necessary to meet standards) and on key browse species (no more than 20% utilization) within identified deer concentration areas. Elsewhere in upland areas, the indicators of rangeland health (e.g., plant species diversity, plant vigor, variety of age classes) will be used to determine if shrub populations are healthy. If they are not, and livestock grazing is determined to be a causal factor, livestock grazing will be adjusted accordingly.

Comment 16-9: Decisions will, of necessity, be made on a case-by-case basis looking at local factors. The main thrust of Alternative 4 was that implementation would occur much more rapidly than the other alternatives. We did not select it as the preferred alternative, however, because the resources required to implement it are not available, and therefore the alternative is not achievable. We believe the preferred alternative will produce the same results, although not as fast, but also with less negative economic impacts.

There is a discussion of monitoring in Appendix 22.

Comment 16-10: While it is the responsibility of BLM to identify those areas available for grazing use through land use planning processes, the determination is not needed in order to identify rangeland health standards and guidelines for those areas where grazing is allowed. Determining areas available for livestock grazing often involves factors in addition to rangeland health, such as usability and feasibility, and can only be determined using a site-specific focus for each particular area. This is more appropriately dealt with in comprehensive land use planning. Determining the appropriate standards and guidelines does not require site-specific evaluations and analysis. The guidelines developed through this process will only be applicable where it has been determined that the lands are available for grazing. There could be situations where rangeland health standards could not be met even with application of the guidelines. If that situation occurs, then the availability of that particular area for livestock grazing may be in question.

Comment 16-11: We have included a monitoring plan in the FEIS as Appendix 22.

Comment 16-12: We have included an implementation plan in the FEIS as Appendix 21.

Comment 16-13: The NEPA process is necessary to determine terms and conditions appropriate for a specific allotment to ensure compliance with the standards and guidelines. Rangeland health determinations and management evaluations are already underway for allotments needing immediate management changes to meet the fallback standards and guidelines. The process is open to interested members of the public and to the lessees/permittees.

Appendix 21 identifies which allotments will be given attention first. Each field office can be contacted for further information about where they are in the process and the opportunities for participation. The exact NEPA process will vary depending upon the magnitude of the problem, the proposed changes, and the concerns about the changes.

Comment 16-14: See the implementation plan in Appendix 21.

Comment 16-15: The implementation plan, Appendix 21, outlines the plans for implementing the fallback standards and guidelines.

We realize that grazing trespass has occurred on the Horse Pasture Ridge Allotment in the past. This grazing use, as well as current authorized grazing use, is not considered to be a major factor in the deterioration of resource conditions, which is predominantly the conversion of native grasses to noxious weeds. The degradation on public lands in the allotment is mostly attributed to other causes, such as recreation use, modern wild fire suppression methods, inherent soil instability and characteristics, and past historic grazing use. There are no known rare plant habitats or rare plants found in the allotment.

The Ord Mountain allotment is located in the California Desert Conservation Area, which is not located within the area covered by this EIS.

We disagree with your assessments of condition on the Carrizo Plain. From our monitoring data, indications are that the area is making significant progress toward meeting the fundamentals for rangeland health. Proper livestock grazing, as you indicate, has been added as a tool in this area to achieve some of the intended objectives for improving resource conditions. If you have verified information to the contrary, please share this information with our field office.

We have identified the Twin Peaks allotment as one of the allotments where one or more of the standards are not being met.

Comment 16-16: The reference you refer to (indicating that modified terms and conditions are to be applied to all high priority allotments within three years of the date of the rule) is not applicable. Although this was identified in the proposed rulemaking for the Rangeland Reform 94 effort, it was not adopted in the final rule that was issued on February 22, 1995.

See Appendix 21 for the strategies and priorities for implementing the standards and guidelines.

Comment 16-17: See the response to comment 10-28.

Comment 16-18: This has been addressed in Chapters 3 and 4 with an explanation of existing planning status, and an assessment of the impacts of this amendment to those plans.

Comment 16-19: Due to the fact that noxious weed infestations cross jurisdictional boundaries as well as allotment boundaries, weed surveys have historically been done on an area-wide basis as opposed to an allotment-by-allotment basis. Many of our surveys are also done in conjunction with counties, local landowners, and state and federal agencies. In 1997, over 250,000 acres of BLM land were surveyed for weeds, not including the California Desert District. While a weed survey and management plan is very desirable, we have asked that these plans be drafted at the Field Office or Weed Management Area level as opposed to the allotment level, and that these plans be multi-agency and jurisdictional. However, any information regarding weed infestations on an allotment will be used for determining whether rangeland health standards are being met, and in determining the appropriate guidelines to apply to reduce further infestations.

Comment 16-20: We have added a paragraph to Section 4.2.5 explaining the process by which we made determinations on the effects of livestock on special status plant species. We

recognize that much inventory work remains to be done before we will have complete information on the distribution and status for all the special status plants found on BLM lands. The scattered land pattern that is common to BLM lands, especially west of the Sierra Nevada-Cascade axis, makes inventory even more difficult. Despite this, several species-directed inventories have been completed in the southern San Joaquin Valley and Sierra Nevada. These have resulted in the discovery of many new occurrences of such plants as Hoover's woolly-star and San Joaquin woolly threads. As a result of these inventory efforts, the U.S. Fish and Wildlife Service (FWS) is working on a package to delist Hoover's woolly-star. Significant inventory efforts have also been undertaken in the Hollister, Clear Lake, Folsom, and Redding Field Office areas as a part of on-going land exchange programs there. In addition, BLM botanists in all Field Offices conduct ongoing surveys to search for new locations of special status plants.

Absent significant new influxes of time and money, however, completion of all the inventories needed is many years away. We believe this is no different than the situation on lands of other ownerships and that management plans cannot be delayed until we know everything we'd like to know.

The statement made in Appendix 11 that "...grazing following the growing season is considered positive because it reduces the amount of residual dry matter and the resulting competition from tall growing annual grasses" was not meant to apply generally to all plant species, but only to the plants in the table for which both positive and negative effects from grazing are indicated. No instructions were given to Field Office botanists that grazing impacts following the growing season should be assumed to be beneficial to the plants.

Comment 16-21: Some of the conflicts with information in the CNPS Inventory are likely the result of different grazing impacts on BLM lands versus those on other ownerships, particularly private. Remember that our assessment of impacts applies only to BLM lands and to the current grazing management (class of livestock, stocking rate, and season of use), while the Inventory's assessment applies to the entire range of each species. Nevertheless, we feel the Inventory is in error with respect to grazing impacts on at least some of the species. Following is the rationale behind our assessments regarding the species you list:

Antirrhinum subcordatum: The "Grazing, Neutral" designation shown in the DEIS for Redding was incorrect. There are no BLM grazing leases known to include any occurrences of this species. The designation has therefore been changed in the FEIS to ungrazed for both the Clear Lake and Redding Field Offices.

Calamagrostis foliosa: There is ample evidence that this species is largely unaffected by livestock grazing. In the King Range National Conservation Area the species thrives both within and beyond the boundaries of grazing allotments. A survey was commissioned by BLM in 1985, in cooperation with The Nature Conservancy. The authors of the report, Katherine Barrows, Debbie Cooper, John Pepper, and Ann Vonnegut, found the species to be "...growing almost exclusively either in crevices in rocks or in very rocky soils. With few exceptions, it was on slopes ranging from steep to vertical, often where slopes were eroding or sparsely vegetated." In 1989, Carol Tyson, BLM seasonal botanist, examined previously known and new sites and documented entire community compositions. She found that the substrate for all the sites consisted of rocky, steep ravines or streambanks and cliffs. In 1990, Carol Helsiek (nee Tyson) completed her Master's Thesis, *Population and Habitat Characterization of Leafy Reed Grass (Calamagrostis foliosa) in the King Range National Conservation Area, California*.

In her conclusion she states: "*Calamagrostis foliosa* occurs on low nutrient, low moisture substrates which are active and eroding. *Calamagrostis foliosa* is an early invader and, therefore, an early successional species. Furthermore, *Calamagrostis foliosa* is disturbance orientated [sic], thus, over protective management practices could be detrimental to its long-term productivity. Although grazing occurs near 8 percent of the *Calamagrostis foliosa* sites, it probably does not contribute significantly to the decline of the species because *Calamagrostis foliosa* appears to prefer rugged, non-grazable sites. However, in areas where *Calamagrostis foliosa* could be jeopardized by grazing, wise management practices should allow for only light grazing."

Calochortus greenii: This species is found on several BLM grazing leases as well as on lands of other ownerships. The Redding Field Office botanist (the species was incorrectly listed as occurring in the Alturas Field Office in the DEIS) believes, based on observations over a period of several years, that cattle are not a major grazer of this species. Rather, over 80% of the herbivory observed on BLM lands is attributable to deer, with some wild horse use. Thus the species is considered to be neutral to the effects of livestock grazing.

Caulanthus californicus: None of the Caliente Field Office occurrences of this species are authorized to be grazed by livestock. Fruiting stems of plants on the Carrizo Plain are removed by giant kangaroo rats and other small mammalian herbivores (Mazer and Hendrickson 1993), but this interaction may not be entirely detrimental. Cypher (1993) found that *C. californicus* individuals were significantly associated with giant kangaroo precincts on the Carrizo Plain. At one site, survival of *C. californicus* individuals was significantly higher on precincts (which tend to be rather heavily grazed by giant kangaroo rats) than off: 70.5% survival on compared to 40.0% off. At the second site, the percentage survival was 61.5% for individuals on precincts compared to 70.4% off. Thus, these data, though suggestive, are inconclusive.

In the Hollister Resource Area there is one population of *C. californicus*, consisting of several sites, in the Kreyenhagen Hills. This population does not overlap with the range of the giant kangaroo rat. Livestock grazing is authorized within the range of this population, but only after seed set. Counts of *C. californicus* individuals in this population conducted every year in the 1990s show stable numbers under this grazing regime. The observations of the Hollister Resource Area botanist are that in years of average-to-above-average precipitation, high, non-native annual grass production created a thick thatch around some of the sites that in his judgement is creating a barrier to the expansion of these occurrences.

Cupressus arizonica ssp. *nevadensis*: The grazing effects on this species are unknown, as we indicated in the DEIS.

Eriogonum prociduum: There have been no noticeable impacts from livestock grazing to this species over 10 years of monitoring. Trend of this species at the Ash Valley Research Natural Area (RNA) is either up or stable. The Ash Valley portion of the allotment is lightly grazed. Because the habitat of the plant is barren with little forage, the livestock may traverse through the habitat, but do not remain. There are definite impacts from vehicular traffic and logging. Inventory of old roads in the Ash Valley RNA has revealed that the species has not reestablished itself like two other special status plants, *Ivesia paniculata* and *Astragalus anxius*, have. The species also occurs on BLM lands outside the Ash Valley RNA, but no obvious impacts from livestock grazing have been observed at these sites. There is a population in the Surprise Field Office area on private lands; although grazed, no obvious impacts to this population have been noted in a few years of observation.

Ivesia webberi: Only a very small portion of a population of this plant occurs within a BLM grazing allotment at a fence corner. The remainder is outside the allotment on private land. Based upon several years of observation, livestock use has been noted as being very light in this corner of the allotment; thus, the impact was judged to be neutral. Future concentration of livestock or early use could negatively impact the species.

Layia heterotricha: The DEIS reported that effects of livestock grazing on this species are unknown. We have changed this in the FEIS to reflect both negative and positive effects. One of our Hollister Field Office botanists has observed that the species is quite healthy on the grazed flat lands of Cantua Creek, as well as on ungrazed, sparsely vegetated road cuts near Cantua Creek. Near Joaquin Rocks, it appears to be barely surviving on road edges, and it diminishes and disappears as one moves away from these roadside locations into denser vegetation. It is expected to benefit from light and properly timed grazing but to be negatively affected by too heavy grazing or grazing during peak flowering season, since the plant is erect and tall enough (up to 1 meter) to be noticed by livestock. Currently, the Hollister Field Office gives no special protection to this species from livestock grazing, and grazing effects on it depend upon whether cattle graze heavily or lightly in particular years.

Lupinus spectabilis: The neutral determination was based on never having seen evidence of the plant being grazed on public lands. During field visits, the Folsom Field Office botanist has observed no evidence of grazing in the habitat where the plant occurs.

Mimulus pictus: This species generally occurs around the base of shrubs such as *Ribes quercetorum* and around rock outcrops. These areas are generally out of reach of livestock. The Caliente Field Office ecologist has observed that livestock do not appear to negatively affect the species where it occurs within grazed areas, but individual plants may be trampled on occasion. Overall, however, the effect of grazing on the species appears to be neutral.

Paronychia ahartii: The designation of this species as neutral to the effects of livestock grazing is based on the past seven years of observations. BLM has more than 33,000 individuals of this species, occurring on four grazing leases. Over this seven-year period, the Redding Field Office botanist has not noticed any apparent decline. This is based only on qualitative site visits in each of the seven years. There are two exclosures that will be studied quantitatively over the next several years to look at changes to the species in grazed versus ungrazed situations. The lands supporting the species have been grazed continuously since the 1850's, yet the species still exists in sizable numbers. In the opinion of the botanist, heavy, confined grazing would be expected to negatively affect the species, but the low to medium stocking rates on the BLM allotments appear to have no adverse effect. The botanist believes grazing may have some positive effects with respect to seed dispersal because the species has a very limited dispersal mechanism. This is something the exclosure studies may reveal.

Polygonum polygaloides ssp. *esotericum*: One of the two occurrences of this species in the Alturas Field Office area is on a grazing allotment administered by the Modoc National Forest. Only summer grazing is authorized and there do not appear to be any effects on this species from domestic livestock. However, wild horses do occur in the area and trampling from the horses has been observed in the silver sage flat where this species occurs. From a livestock grazing standpoint, however, the species appears to be largely unaffected.

Senecio layneae: The occurrences of this species on BLM lands on the gabbro formation in the vicinity of Pine Hill, El Dorado County, are not grazed by livestock. In the Red Hills of

Tuolumne County, the species occurs in widely separated locations, some of which are within a grazing lease. However, the areas where the species occurs within that lease are road cuts in relatively steep terrain where livestock have not been observed to frequent. Thus, the species is considered to be unaffected by livestock grazing.

Streptanthus oliganthus: Although this species occurs within a grazing allotment, the area it inhabits is not grazed by livestock because of topography. The species occurs on steep slopes and in rocky areas. The three confirmed populations have not shown signs of cattle impact nor any general cattle use in the area. The last survey was performed in 1993.

You will probably also be interested in the response to comment 1-55.

Comment 16-22: The list of species known to be impacted by grazing has been changed slightly based upon information obtained from Field Office botanists following receipt of comments on the DEIS. See the section on special status plants in Chapter 4 (4.2.5) for the new list of 24 plants known to be negatively impacted by grazing. Appendix 11 has also been modified to more clearly explain the nature and extent of the negative impacts on each of these plants. The measures that will be taken to remove the grazing impacts to these species will be developed on a site-specific basis by individual Field Offices. The types of actions that will be taken may include one or more of the following: reduction in stocking rate, changes in season of use, protection by fencing, or redistribution of livestock away from special status plant populations (by herding or locating mineral blocks and water sources well away from the populations). If none of these actions works or is infeasible, livestock grazing may be eliminated entirely from the allotment or pasture containing the species.

Comment 16-23: Although it is not part of the area covered by this EIS, the California Desert District is indeed in need of botanical expertise, a fact that is recognized in that District's target table of organization.

Comment 16-24: We disagree with your statement that water quality improvement will not occur as a result of this effort. The preferred alternative includes specific emphasis and standards related to water quality as well as reference to identified BMPs for livestock grazing to be applied to help protect water quality. Once a site-specific impairment is known or threat of impairment is apparent from livestock grazing activities, BLM has the obligation to apply whatever management measures are needed to correct the problem. These management actions will be coordinated with the appropriate State/Regional agencies and EPA.

Comment 16-25: We disagree that BLM is required to acquire certification under 401 of the Clean Water Act for all activities as you indicate. Test cases regarding the application of this requirement for livestock grazing as a non-point source of pollution are still pending. We also do not agree with your concept of Best Management Practices (BMPs). Our concept of the identification and application of BMPs is similar to that developed by other State and Federal agencies in California and as adopted by other western states and approved by EPA. The BMPs as listed are an identification of the "types" of actions to be taken to help protect water quality, whereas the specific practices designed and prescribed for any particular allotment will then be the actual best management practices to be applied for that purpose and situation.

We have modified the set of BMPs for application in California from those listed in the DEIS. This list was developed with the participation of and review by staff from the State Water Resources Control Board. We fully realize that merely applying BMPs in themselves does not

guarantee compliance with water quality standards. BMPs are suggested tools to use for minimizing pollution occurrences. Site-specific management measures will be designed and prescribed when needed for impaired water bodies in coordination with the Regional Water Quality Control Boards, the States, and all interested parties.

Comment 16-26: See response to comment 16-25.

Comment 16-27: See the general response on process in this chapter, Section 5.4.1. Also see the implementation plan in Appendix 21.

Comment 16-28: This is addressed in the cumulative impacts section in Chapter 4.

Comment 16-29: See the new monitoring section (Appendix 22) we have added to the FEIS.

Comment 16-30: Complete rest is one of the management options available to improve riparian areas. It will be used where the risk of degradation is high or sensitive resources are present and Field Office Managers have determined that other options will not produce results quickly enough. As both Clary and Webster (1989) and Elmore and Kaufman (1994) point out, other grazing management strategies can also result in riparian area improvement. These include the use of riparian pastures, spring grazing, and attention to stubble height guidelines (with respect to the latter, see also Hall and Bryant 1995).

We recognize the value of exclosures and have established these in many places within the EIS area. For example, there are 51 exclosures larger than 1 acre in the Eagle Lake Resource Area (the largest of these is about 300 acres). In the Surprise Resource Area there are about 70 exclosures, ranging in size from 0.1 acre to several thousands of acres. In the Alturas Resource Area there are about 16 exclosures. The Bishop Resource Area has 18 exclosures, the Redding Resource Area 2, the Caliente Resource Area 5, and the Hollister Resource Area 10. Many of these exclosures were constructed, not to evaluate range conditions, but to protect some resource value (e.g. riparian areas, special status species, etc.). Most are still valuable from a monitoring perspective. The condition of many of these exclosures is suspect because of inadequate funding for maintenance. Maintenance of exclosures is a labor intensive proposition. We will add additional exclosures if we determine these to be needed. Small cages are in many ways more valuable than large exclosures because they are relatively inexpensive, can be placed anywhere monitoring is important, and can be moved to accommodate changes in management. Reference sites identified by the Natural Resources Conservation Service and BLM coupled with portable cages will be a valuable tool for assessing whether particular sites are meeting or making significant progress toward meeting both the standards and desired plant community objectives.

Comment 16-31: See the general response to process questions in Section 5.4.1

Comment 16-32: See the general response to process questions in Section 5.4.1

Comment 16-33: See comment 16-5, and Appendix 7. For purposes of this analysis, there is no point in further separating the data.

Comment 16-34: Without doing a site-specific, allotment-by-allotment evaluation, that information is not available. With current data, only a general time estimate is possible.

Comment 16-35: See the implementation plan in Appendix 21.

Comment 16-36: See response to comment 10-28. The interim guideline has been replaced by a utilization level guideline (no. 16) in the preferred alternative. We believe this new guideline will provide better protection from any harmful effects from overutilization and in instances where overutilization may have occurred, successful recovery is much more likely, particularly for upland perennial vegetation.

Comment 16-37: This was done by staff in each field office.

Comment 16-38: We have added a monitoring section to the FEIS (Appendix 22). That discussion applies to all alternatives.

Comment 16-39: Much of this information is included in the implementation plan in Appendix 21.

Comment 16-40: We have identified basic schedules for implementation for each allotment in the implementation plan (Appendix 21). The specific management actions needed are either currently being determined, or will be determined later on an allotment-by-allotment basis.

Comment 16-41: See the new sections in Chapters 3 and 4 addressing plan amendments.

Comment 16-42: See response to comment 16-19.

Comment 16-43: See response to comment 16-30.

Comment 16-44: See response to comment 16-22.

Comment 16-45: See response to comment 16-25. Through this EIS process the public has been given ample opportunity to review the draft BMPs. The draft BMPs in the Draft EIS, as well as those modified for the Final EIS, were closely developed with California's State Water Resources Control Board staff, and oversight opportunities were provided to the staffs of the Nevada Division of Environmental Protection and the Regional Office of EPA. With this participation, and the coordination made with other existing and approved BMPs for grazing, there has been considerable peer review. Effectiveness monitoring has been specifically added as a part of the revised BMPs for California (Appendix 10) and remain in the proposed BMPs for Nevada (Appendix 9).

Comment 16-46: All interested public and affected interests for any given allotment will be given opportunities through consultation, cooperation, and coordination to provide any known information and to help develop management solutions.

Comment 16-47: A new alternative 5 has been added to the FEIS as the preferred alternative. See the general response to process in Section 5.4.1.

Comment 16-48: We agree that the recommended indicators would be valid properties to assess soil health. Appendix 14: Soil Standards, pages 1-3 of the EIS compares and analyzes the use of soil resource parameters between alternatives. However, establishing a range of values for these indicators is beyond the scope of analysis of this document. This may be done

at the site-specific level during analysis of problems, when corrective actions are being developed.

Comment 16-49: See general soils response in section 5.4.1.

Comment Letter 17 -- Amador County Board of Supervisors

Comment 17-1: Comment noted

Comment Letter 18 -- Siskiyou County Board of Supervisors
(Two letters)

Comment 18.1-1: Comment noted.

Comment 18.2-1: A cumulative impacts section has been added to Chapter 4.

Comment Letter 19 -- Lassen County Board of Supervisors

Comment 19-1: Comment noted.

Comment Letter 20 -- Don P. Mullally

Comment 20-1: Within the EIS area, the only areas we manage that correspond to these habitats are high elevation areas in the Inyo Mountains. These areas are not grazed by livestock, and are now within the South Inyo Wilderness.

Comment 20-2: The standards and guidelines in the preferred alternative address the ecological function of habitat (vegetation quality) of winter ranges and migration corridors. Assessments and management changes when the standards are not met at the allotment level will meet this need.

Comment 20-3: California-BLM already has a system of natural areas in place. Currently we have 53 Areas of Critical Environmental Concern (ACECs) in the EIS area, 12 of which have also been designated Research Natural Areas (RNAs). Most of these areas were designated based on the presence of rare, sensitive, or unusual plants, animals, communities, and/or cultural resources. Most of these areas are ungrazed. On December 12, 1996, BLM issued a policy on designating RNAs (Instruction Memorandum CA-97-031). This policy requires field offices under the direction of the California State Director to designate RNAs (which will also be ACECs) with good representative stands of all the plant communities (whether rare or common) that occur on BLM lands. As stated in Section VI.2 of the policy, "[a]reas established as Research Natural Areas shall be of sufficient number and size to adequately provide for habitat stability, scientific study, education use, and demonstration purposes."

The first order of business is to conduct a gap analysis to determine whether these communities are already represented in existing RNAs/ACECs, either those managed by BLM or by other Federal or State agencies. We're using the California Native Plant Society's classification system (Sawyer and Keeler-Wolf 1995). After the gap analysis is complete and we have determined which plant communities to target for future RNAs/ACECs, we will begin to designate more of these areas. Although this will take several years, our goal is to have an interagency system of research natural areas that conserves representative stands of all the plant communities (called "series" by Sawyer and Keeler-Wolf 1995) in California and the 1.5 million acres of northwestern Nevada administered by California-BLM. By policy, these RNAs will not be grazed by domestic livestock unless it has been determined that livestock grazing is necessary to conserve natural elements of the RNA.

Comment 20-4: Our statement in Chapter 4, page 6, of the DEIS says: "[e]pisodic recruitment of shrubs, trees, and perennial herbs will be allowed to occur by reducing or removing grazing and browsing pressure during the critical period of establishment." By "establishment" we mean that young plants will be allowed to grow into adults. Standards under all alternatives, including the preferred, require a variety of age classes for most perennial species.

Comment 20-5: We agree that the diversity and age classes of plant species are an important part of rangeland health. All three RAC areas have standards and guidelines relative to this component of rangeland health. We also agree that in many situations the presence of non-native plant species contributes to a deterioration in rangeland health. This is certainly true of cheatgrass and medusahead dominated areas in the sagebrush steppe vegetation type. These standards and guidelines emphasize the diversity of native plant species. Species diversity is often high in the annual grassland vegetation type despite the dominance of introduced annual grasses, but the perennial bunch grasses that once were much more prevalent are either less common or absent. Management objectives to increase the numbers and vigor of perennial grasses within the annual grassland type have been developed for some areas managed by BLM. Examples are the Carrizo Plain, Fort Ord, and Cache Creek. We believe that increasing the occurrence of these species will result in healthier rangelands. Elsewhere within the annual grassland type, however, objectives are increased production and soil protection. We believe that conservation of soil resources is vitally important because this conserves rangeland potential. Even if the vegetation currently present on a site is not desirable, conservation of that site's soil sustains the potential of the site to someday support a healthier rangeland. For example, there are rather large areas of northwestern California which are currently dominated by the alien grass, medusahead. We currently do not have the knowledge and technology to replace these medusahead stands with the native perennial grasses and forbs that formerly occurred in these areas (at least not within the limits of current budgets). Conservation of the soils on these sites, however, will ensure that we will be able to convert these areas to desirable species when cost-effective technologies are developed.

Comment 20-6: See responses to comments 1-61 and 10-4.

Comment Letter 21 -- Shirley Murrer

Comment 21-1: We agree. With a few changes (water quality standard and utilization level for Susanville), the preferred alternative (Alternative 5) is very similar to Alternative 1.

Comment 21-2: Thank you. These have been corrected in the Final EIS. The total number of allotments in the table was wrong and should have been 705. In preparing the Final we identified further changes in the number of allotments. These were due to recent land exchanges and some previous misinterpretations of older data. The total number of allotments now stands at 649. These allotments are shown in the Implementation Plan in Appendix 21.

Comment 21-3: We agree.

Comment 21-4: This may be true. This is mentioned in Chapter 1, Section 1.3 where we defined the fundamentals of rangeland health, but is not really mentioned again.

Comment 21-5: Cost effectiveness and ability to implement the standards and guidelines is a primary consideration. That is one of the factors in prioritizing allotments for implementing the standards and guidelines (see Appendix 21); and it is the primary reason that Alternative 4 was not chosen.

Comment 21-6: The RAC chose not to change the preamble.

Comment 21-7: General stubble height guidelines of 4-6 inches will be applied to key areas on allotments not meeting or making significant progress toward meeting one or more standards. These general guidelines will apply until Field Offices develop site-specific guidelines (see Alternative 5, Susanville Guideline 16, for more information).

Comment 21-8: The guideline is intended to apply to perennial plant growth that is affected by direct herbivory by livestock. The critical period is in the spring when the plants are actively growing. Grazing systems generally provide periodic rest during the growing season either by totally resting pastures every few years or by deferring grazing in the pasture until after the growing season every few years, or by a combination of these practices.

Comment 21-9: See the general response to impacts from other programs and uses in Section 5.4.1 of this chapter.

Comment 21-10: We don't consider this phrase to be necessary.

Comment 21-11: We agree and have eliminated the guideline in the preferred alternative and replaced it with Guideline 16.

Comment 21-12: We tried to clarify this concept in the document, and are glad that you understand it. We will be incorporating additional measures to assess rangeland health into our monitoring program (see Appendix 22). And, while ecological condition does not translate directly into rangeland health, we believe that when these additional measures are applied to rangelands conforming to the example you cite (poor condition with no upward trend), the conclusion in most cases will be that those rangelands do not meet the standards for rangeland health.

Comment 21-13: While not the opinion of all users, cattle and their impacts are considered by many to be an intrusion in what would otherwise be more natural or primitive settings. This is a common observation (D.Dodge and J.Pollini, BLM, personal comm.), documented in the recreational research literature (Sanderson, et al. 1987), and even in recent articles in the news media (Shuman, Oct. 1997).

Comment 21-14: What was meant by the statement is that most ranchers would be able to continue to subsist by ranching, and continue living in a small rural community if they so choose. We realize that the world is constantly changing and that these changes (markets, regulations, influx of recreationists or new neighbors) affect ranchers (as they do all of us). Because of this dynamic, there is a requirement that we continually examine the way we do business so that we can continue to prosper and live as we choose.

Comment 21-15: It is because of the lack of personnel and funding that we are forced to prioritize how we will implement the standards and guidelines. This was recognized when the new grazing regulations were promulgated in February 1995, and mentioned in the Draft EIS in Chapter 2, page 4. It is partially for this reason (see response 10-5) that we did not select Alternative 4. For an actual discussion of how we intend to implement the standards and guidelines, see Appendix 21.

Comment Letter 22 -- Sveinn Erik Ólafsson

Comment 22-1: The types of mitigations you use as examples are included as implementation tools within the identified guidelines and the proposed best management practices for water quality in Appendices 9 and 10. The specific use and design of any management measure will need to be determined on a site-specific basis as part of the implementation of the guidelines for any given allotment.

Comment 22-2: We have included this information in the Implementation Plan and Monitoring Plan (Appendices 21 and 22) in the Final EIS.

Comment 22-3: Correct. We do not believe that this is necessary. We have included miles and acres of riparian areas and wetlands (see Tables 3.4.1 and 3.4.1(a)).

Comment 22-4: Although cryptosporidium is not specifically addressed in the EIS, contamination of water from animal borne pathogens is identified as a concern and impact in Chapter 3, page 44, and Chapter 4, page 9, of the Draft EIS.

Comment 22-5: For the most part, restoration will occur through better management of grazing. This is particularly true for riparian areas, which generally have the capability for relatively rapid recovery. Sensitive areas (e.g., areas supporting special status species, riparian areas with easily erodible soils) and areas that have been recently burned may require active restoration efforts such as seedings, willow plantings, etc. These, however, will be necessarily limited by available personnel and budgets (although fire rehabilitation is less limiting due to supplemental budgeting for this purpose). It is important to recognize that there are upland areas, particularly in the sagebrush steppe vegetation type, that will likely never be restored to their presettlement condition. While these areas were degraded by overgrazing, this overgrazing occurred during the period before passage of the Taylor Grazing Act of 1934, a period when grazing was unregulated on public lands (see Chapter 3, Section 3.3.2, Sagebrush Steppe, for more information on this issue).

Comment 22-6: The maps were intended to give only a general overview.

Comment 22-7: Our botanists and wildlife biologists keep current with information on file both with the U.S. Fish and Wildlife Service (FWS) and the Natural Diversity Data Base maintained

by the Natural Heritage Division of the California Department of Fish and Game (CDFG). In fact, most of the information on special status species occurrences on BLM lands that is on file with those agencies was provided to them by BLM personnel. The data on special status species given in Appendices 11 and 12 were from these sources, and have been reviewed by the FWS. CDFG has also reviewed these lists.

Comment 22-8: We do not keep track of the ethnic background of the permittees. All of them either own or lease private land that is the base property enabling them to acquire or keep a lease or permit.

Comment 22-9: There are no "grazing rights" per se for public land grazing. For public lands determined available for grazing use, livestock operators can obtain a grazing preference through a permit or lease to graze a specific area, commonly known as an allotment (see the description in Section 3.2. for a more complete explanation).

The current price for grazing is \$1.35 per AUM on public land. This price varies annually, depending upon a set formula developed by Congress. The price on private land varies considerably, and averaged \$10.10 per AUM in California in 1996. On some privately owned land, the landowner also maintains livestock grazing facilities which may be a factor for the increased price per AUM over public land.

Comment 22-10: The majority of tax payers do not benefit from grazing on public land. Local communities benefit by having viable economies supported by ranchers, as well as receiving property taxes, etc., from those same ranchers.

Comment 22-11: The best management practices for water quality developed by the State of Nevada are intended to serve as management guidelines for all lands in Nevada to help prevent non-point source pollution to water bodies. Only when the suggested practices become requirements as terms or conditions for a specific land use activity, such as a grazing permit, will the term "shall" then be appropriate.

Comment 22-12: See the new paragraph we've added to Section 4.2.5 in the FEIS, explaining the process we used for making determinations as to whether livestock grazing effects are neutral, negative, or positive on particular special status plant species. *Allium jepsonii* is listed as ungrazed on BLM lands because it does not occur within a grazing allotment (i.e., grazing is not authorized in its habitat on BLM lands). Based on the best available information, the list of special status plants on BLM lands is complete. Remember that we list only those plants known to occur on BLM lands within the area covered by the EIS; this excludes the area within BLM's California Desert District. Two of the plants you cite as missing from the Appendix 11 list, Cushenberry milkvetch (*Astragalus albens*) and Nevin's barberry (*Berberis nevadensis*), do occur on BLM lands, but not within the EIS area; both occur in the California Desert District. None of the other plants you cite have been documented as occurring on BLM lands.

Comment Letter 23 -- City of San Diego, Metropolitan Wastewater Department

Comment 23-1: Your comment supporting the use of biosolids on rangelands was considered but was not specifically identified as a management measure or referred to in the guidelines or water quality best management practices for the preferred alternative in the FEIS. The BLM's mission is to manage *natural* ecosystems. This mostly precludes the addition of fertilizers. The

only foreseeable exceptions to this would be in restoring environmentally sensitive areas where we have determined fertilization is necessary to meet restoration objectives. In those limited situations we will consider the use of biosolids.

Comment Letter 24 -- Robert Schluter

Comment 24-1: Alternative 5, the preferred alternative, is Alternative 1 with modifications based upon comments and further research.

Comment 24-2: The preferred alternative has deleted Guideline 14 and replaced it with Guideline 16.

Comment Letter 25 -- Elizabeth L. Painter

Comment 25-1: We recognize that there is a need for detailed standards and guidelines that will be applied on a site-specific basis. However, the requirement is to produce regional or state-wide standards and guidelines to be applied over an extremely varied (climatic, topographic, soil type, vegetative type, etc.) area. For that reason, we have incorporated utilization levels and stubble heights into the preferred alternative that we believe will, when implemented on areas not meeting the standards, result in making significant progress toward meeting the standards until more site-specific guidelines can be developed to meet those local conditions.

Comment 25-2: Comment noted.

Comment 25-3: Comment noted, see response 25-1.

Comment 25-4: See response 25-1.

Comment 25-5: See the monitoring section we have added to the FEIS (Appendix 22).

Comment 25-6: See the implementation section we have added to the FEIS (Appendix 21).

Comment 25-7: See response 25-1.

Comment 25-8: See the general response to soils in Section 5.4.1 of this chapter.

Comment 25-9: See response 25-1.

Comment 25-10: These things will be decided on a case-by-case basis during site evaluations.

Comment 25-11: In addition to quantifiable residual dry matter (RDM) guidelines, we also include quantifiable utilization and stubble height guidelines. As you state, the RDM method was developed for use on alien annual grasslands, but these are the predominant grasslands of cismontane California. Your contention that RDM was designed to maximize livestock production is debatable, but it is generally true that leaving higher levels of mulch results in higher levels of plant production (within the limits imposed by weather). These higher levels of plant production, however, are available not only to livestock but to native herbivores as well;

they also provide protection against accelerated soil erosion. In addition to being used on private rangelands, RDM has been in use on rangelands managed by both BLM and the Forest Service since at least the early 1980s.

We recognize that there are situations where managing for the RDM levels given in the guidelines may be at cross purposes with managing for native species of plants and animals. There is evidence, for example, that RDM levels should be lower than those given in the guidelines in order to promote recovery of special status plants and animals in the southern San Joaquin Valley. In those situations site-specific guidelines will be developed that may require less RDM be left in order to enhance the habitat of special status plants and animals. Research is ongoing in the southern San Joaquin Valley and the Carrizo Plain to determine the effects of grazing on RDM levels and on how these RDM levels affect special status species.

Vallentine (1990) states "[RDM] is more a monitoring tool than a predictive tool for achieving proper use because of difficulty in predicting all of the three required factors in advance of grazing." We use RDM as a monitoring tool.

Comment 25-12: Appendix 22 lists the monitoring methods that will be used. Each of these is described in detail in BLM et al. (1996a and 1996b).

Comment 25-13: We agree that standards must be measurable to the degree that we can determine whether we are meeting a standard or not. It is not true, however, that the measures always need to be quantifiable. There are some attributes of the standards that are quite meaningful, yet not quantifiable. For example, one indicator used to support the riparian standard for the area covered by the Bakersfield RAC is that "plant species present indicate that soil moisture characteristics are being maintained." This can be measured by visiting a site and seeing whether obligate wetland-dependent species are present or not. There is no need to count how many of each of these species is present -- if soil moisture characteristics are not being maintained, the species will not be present at all.

Many of the other indicators will be assessed using qualitative procedures (see Appendix 22) applied by an interdisciplinary team. We believe that those indicators obviously not meeting the standards can be adequately measured this way. Once management changes have been implemented to move these indicators toward meeting the standards, quantitative monitoring of these indicators can be initiated.

Where appropriate, we have added quantifiable measurements to some of the guidelines to help us determine management thresholds for rangeland health. These are reflected in the preferred alternative.

Comment 25-14: See responses 25-1 and 10. We have provided quantitative, measurable guidelines on RDM, on utilization of perennial grasses, on stubble heights in riparian areas, on riparian trees and shrubs, and on upland shrub species in deer concentration areas. These will be applied on allotments not meeting, or making significant progress toward meeting, the standards unless and until site-specific guidelines for these attributes are developed. Given the tremendous variability between vegetation types and ecological sites within vegetation types, we do not believe it is possible to provide quantitative, measurable standards for things like total vegetation cover or amount of bare soil. These will be developed on a site-specific basis. See the Implementation Plan (Appendix 21) and the Monitoring Plan (Appendix 22) for more information.

Comment 25-15: Monitoring is addressed in Appendix 22.

Comment 25-16: See the implementation plan in Appendix 21. Actions for each allotment will be determined based on site-specific analyses that are not yet fully completed, and in consultation with all interested and affected parties.

Comment 25-17: We do not agree that our evaluation of current ecosystem condition is "subjective." We believe we have included quantitative information appropriate to a programmatic document such as this. See the responses to Comments 1-55 and 16-21 for citations on available studies supporting our determinations of grazing effects on special status plant species. To assess impacts to special status animal species we used the Draft Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1997) and other similar reports.

Comment 25-18: We realize that we have gaps in the data, and are working on it. Due to the fact that noxious weed infestations cross jurisdictional boundaries as well as allotment boundaries, weed surveys have historically been done on an area-wide basis as opposed to an allotment-by-allotment basis. Many of our surveys are done in conjunction with counties, local landowners, and state and federal agencies. In 1997, over 250,000 acres of BLM land were surveyed for weeds, not including the Desert District. While a weed survey and management plan is very desirable, we have asked that these plans be drafted at the Field Office or Weed Management Area level as opposed to the allotment level, and that these plans be multi-agency and jurisdictional.

Comment 25-19: See responses 5-7 and 13-3. The actual desired plant community for any given area will be determined through the land use plan for that area, not this EIS.

With respect to the annual grasslands of California, we do not believe that current technology and budgets allow us to manage for perennial grass species except in areas where remnant stands of these species still occur or in areas (like the Carrizo Plain and Fort Ord) where one of the overriding objectives is to restore the land, to the extent possible, to presettlement conditions. Even in those areas, however, it is not reasonable to expect elimination of the common introduced annual grasses (e.g. *Bromus madritensis* ssp. *rubens*, *Avena fatua*, etc.) that Heady (1977) calls "new natives." Witness the Jepson Prairie Preserve in Solano County. The area was set aside because it contains some of the best remaining stands of purple needlegrass (*Nasella pulchra*) remaining in California. For many years The Nature Conservancy has been managing this area to increase purple needlegrass and decrease introduced annual grasses. Although they have had success (see, for example, Pollak and Kan, in press), many exotic annual grasses are still common there. On the Carrizo Plain, the habits of the endangered giant kangaroo rat appear to be favoring exotic annual grasses over native species (Schiffman 1994).

Comment 25-20: We are unsure what discrepancies you refer to. Appendix 11 is the most current list of special status plants that are known to occur on BLM lands within the EIS area. Discrepancies with other lists could occur for a variety of reasons. One is that some lists include plants that are suspected to occur on public lands but whose occurrences have not yet been verified. Another is that species have been discovered to occur since the NEPA document in question was prepared. Another is that some NEPA documents have included plants that are not special status species. Special status species are those that meet any one of the following criteria: Federal listed endangered or threatened; Federally proposed; Federal candidates; State listed rare, threatened, or endangered; or BLM sensitive. Another reason for

discrepancies with other lists is that certain plant species have changed in status. In February 1996, the U.S. Fish and Wildlife Service (USFWS 1996) eliminated many plants from its list of candidate species. (The plants dropped were all those plants formerly regarded to be "Category 2 species"; these were "taxa for which information ... indicates that proposing to list as endangered or threatened is possibly appropriate, but for which sufficient data ... are not currently available to support proposed rules." USFWS 1993.) Subsequent to this move by USFWS, BLM issued a policy designating all California Native Plant Society List 1B plants (Plants Rare, Threatened, or Endangered in California and Elsewhere; Skinner and Pavlik 1994) as special status species. Most, but not all, former Category 2 candidates are included in List 1B. In addition, List 1B includes some plants that were not Federal candidates (either Category 1 or 2). Thus, lists of special status plants constructed prior to 1996 are somewhat different than the current list.

Comment 25-21: See the amended Appendix 11 and responses to Comments 16-20, 16-21, and 1-55. We recognize that litter and/or standing dead biomass are important to particular plants. We also recognize that the lack of these are important to others. Based on a combination of studies and the professional judgment of BLM botanists, we have determined that particular special status plants, all annuals, have or would benefit from some levels of livestock grazing. In some cases this livestock grazing does not occur until after seed set (e.g., *Caulanthus californicus* in the Hollister Resource Area), thereby reducing levels of RDM present at the onset of fall rains. In other cases grazing during the growing season does not appear to adversely affect particular species directly, but serves to reduce RDM levels and enhance growing conditions for the species in the following year (e.g., *Lembertia congdonii*; see response to your Comment 25-23).

Comment 25-22: The studies and/or observations of BLM botanists on the condition and effects of livestock grazing on special status plants integrate all of the effects you mention.

Comment 25-23: No livestock grazing is authorized within the range of *Eremalche kernensis* on BLM lands. All of the occurrences of *Caulanthus californicus* on public lands in the Caliente Resource Area are ungrazed; only the one occurrence in the Hollister Resource Area is allowed to be grazed, but only after seed set. BLM inventories conducted since the Taylor and Davilla (1976) study have shown both *Eriastrum hooveri* and *Lembertia congdonii* to be much more widely spread and abundant than indicated by Taylor and Davilla (1986) and Taylor (1989). As of 1995, 627 new occurrences of *Eriastrum hooveri* and 535 new occurrences of *Lembertia congdonii* had been discovered since those two studies (Willoughby 1995). More have been discovered since. A delisting package for *Eriastrum hooveri* has been submitted by the USFWS Sacramento Field Office to its Regional Office in Portland, Oregon. See the amended Appendix 11, as well as responses to Comments 16-21 and 1-55. With regard to *Lembertia congdonii*, Taylor (1989) states:

Observations in the field suggest that moderate grazing may have few direct influences on the species. To be sure, heavy overstocking of cattle on annual range is probably detrimental to *L. congdonii* as it is to most native herbs. Grazing impacts are everywhere evident on the Carrizo Plain, where the majority of extant *Lembertia* populations grow. At this locality, it appears that heavy sheep and cattle grazing does not directly affect *L. congdonii*, owing to its decumbent habit. By contrast, sheep grazing in the Lost Hills population of *L. congdonii* has a direct detrimental influence. Large bands of sheep disrupt the

cryptogamic soil crust, making *Bromus rubens* density uniformly high, possibly out-competing *L. congdonii*.

Note that the Lost Hills population is on private lands. Cypher (1996) notes that livestock grazing has negative effects on *L. congdonii* in livestock concentration areas (e.g., near watering troughs), but appears to benefit the species elsewhere by reducing competition and RDM levels.

Comment Letter 26 -- Paula Schiffman

Comment 26-1: See the responses to comments 25-1, 10 and 14.

Comment 26-2: Although we recognize that many of the standards and guidelines are more general in nature than some people desire, we disagree with your opinion that the document is one giant loophole. The attempt is being made to use language that can be clearly understood by all parties -- to truly describe what BLM's management goals are for the public rangelands, and how to tell if we are meeting those goals. See the responses to comments 25-1, 10 and 14.

All users of the public lands are seeking something, be it a recreational experience hiking, on a mountain bike, or fishing; be it forage for their livestock; be it gravel for maintaining a highway. In most cases, for the public lands to continue providing this item (value or commodity), they must be properly functioning. "Sustaining the capacity of rangeland to satisfy values and produce commodities" means keeping the public lands healthy so that people can obtain the things they seek from those lands.

There are many factors that may be used in determining priorities for implementing the standards and guidelines. Ecosystem position relates to where a problem is physically situated. For example, if the problem is a small upland area away from the riparian area it may be less important that a similar problem immediately adjacent to the riparian area. Resource risk is whether a resource is on that borderline of becoming nonfunctional. For example, it would be better to deal with a riparian area that is functioning at risk, but has potential for improvement than to deal with an area that has crossed the threshold into being nonfunctional, and would require a tremendous amount of effort, time, and money to repair (and even then might not recover). Biological values are parts of a properly functioning ecosystem, habitat characteristics, etc., that contribute to a healthy functioning rangeland that support a diverse range of plant and animal species and support various uses.

For a basic introduction to much of this, we suggest you read *Rangeland Health: New Methods to Classify, Inventory, and Monitor Rangelands* by the National Research Council (NRC 1994). You might also wish to read the Range Reform 94 EIS (Bureau of Land Management and U.S. Forest Service 1994).

Comment 26-3: We met on several occasions with representatives of the U.S. Fish and Wildlife Service (USFWS) on the preferred alternative and on the content of the DEIS. We have letters from both USFWS and the National Marine Fisheries Service that concur with our conclusion that implementation of the standards and guidelines will have no adverse impacts on any listed, proposed, or candidate species. We have received comments from the California Department of Fish and Game on the DEIS (see Letter Number 34).

Comment 26-4: There was no attempt to "pull a fast one." To send a personal invitation to every professor of rangeland science, botany, soil science, hydrology, etc., in every university or college in this state (let alone surrounding states where people may have interests in this state) was beyond our capability. We notified those people whom we knew were interested, we notified organizations, and we placed notices in the media. We are grateful that you were informed of the project by Ms. Roberson.

Comment 26-5 & 6: We are aware of the proceedings of the 1981 California Riparian Systems Conference (Warner and Hendrix 1984) as well as the follow-up conference in 1988 (Abell 1989); the latter conference was cosponsored by BLM. The 1981 conference contained little information on the effects or management of livestock grazing in riparian areas; the most cogent paper was one by Platts (1984), which reported preliminary findings on research that he reported on later (see Platts' references in the annotated bibliography). For that reason we did not reference it in the DEIS. The 1988 conference did contain several papers on livestock grazing in riparian areas (see the papers in Session C: Rangeland and Desert Riparian Systems and the Introduction by Willoughby 1989). As the papers in the 1988 conference and several papers by Clary and Platts (see annotated bibliography) and Elmore and Kauffman (1994) attest, livestock grazing, if properly managed, can be compatible with improving and maintaining healthy riparian systems.

Comment 26-7 & 8: We are well aware of the variability of precipitation and the fluctuating soil-moisture conditions within the EIS area as a result of location and variability between seasons. Unfortunately most official climate recording stations are not near BLM administered rangelands and we can only estimate the relationships. We carefully consider these variabilities when determining management measures and in establishing grazing management prescriptions and determining proper utilization levels, as for example, the RDM levels for varying precipitation zones found in the guidelines for application to the Annual Grasslands in the preferred alternative and some other alternatives. The timing for grazing management schemes and management flexibility must keep seasonal variations in mind also. These types of determinations need to be made at the site-specific level and therefore are not included in this document.

Comment 26-9: Whether or not an ecosystem has been grazed historically by large herbivores is in itself immaterial in determining whether or not an ecosystem can be properly managed for grazing livestock and yet sustain other desired values from the ecosystem. The key question is: how do grazing and related activities influence the vegetation, soil, water, and other attributes and how can it be managed to enhance and sustain desired values and outcomes involving native species and their habitats? In some situations livestock grazing, no matter how it is managed, may not meet these goals, while in others, grazing may be able to be managed harmoniously or even in some cases as a tool to help reach these goals.

We have added a new paragraph to the FEIS (Chapter 3, Section 3.3.2) that addresses your concern and cites the article by Elizabeth Painter (1995) to which you refer.

Comment 26-10: See the response to comment 5-7.

Comment 26-11: Native forbs in what is now considered annual grassland have not been displaced by introduced alien plants nearly to the extent that these aliens have displaced native perennial grasses. Many species of native forbs occur throughout the geographical extent of the annual grasslands. Certainly, the introduced annuals affect the dominance of native forbs,

particularly in years conducive to the growth of annual grasses. Range managers have noted the occurrence of "grass years," "filaree years," and "clover years" (Bentley and Talbot 1951), related to fall weather patterns and the physiological tolerance of the dominant species (Bartolome 1989; Pitt and Heady 1978). The percent composition of native forbs varies greatly depending on the degree of competition with the introduced annuals. For example, Bentley and Talbot (1948) found that native annuals comprised 20-60% of the total cover at the San Joaquin Experimental Range, depending on rainfall pattern. Although weather is overriding, some levels of livestock grazing would be expected to increase the dominance of native forbs by reducing RDM levels, thereby discouraging the growth of taller annual grasses in the following year and encouraging the growth of native forbs (Heady 1956).

Comment 26-12: We disagree with your comment, but it is noted.

Comment 26-13: We agree that the area encompassed by this document is very diverse and that, because of this diversity, the document cannot be very detailed. We disagree with your assessment that the lack of detail in this document will result in disastrous and irreversible management decisions. This is intended to be a programmatic EIS that gives overall guidance to field offices in grazing management. Field office decisions will continue to require NEPA compliance to consider site-specific impacts of grazing management activities on biological diversity, special status species, and all of the other components of rangeland health, as described in this EIS. Because the standards and guidelines contained in this EIS, as well as BLM policy, require the conservation of special status species, BLM's grazing management practices cannot be reasonably expected to result the extinction of any species.

Comment Letter 27 -- United States Environmental Protection Agency

Comment 27-1: The implementation plan added to the Final EIS (Appendix 21) focuses on making those needed changes.

Comment 27-2: The Implementation and Monitoring Plans (Appendices 21 and 22) includes the information you suggest.

Comment 27-3: The water quality issue has been thoroughly discussed with the States of Nevada and California. Changes have been made to the standards in the preferred alternative, and guidelines added. We have also made changes to the BMPs for water quality (see Appendices 9 and 10). See response 27-7.

A cumulative impacts section has been added per your suggestion.

Comment 27-4: We agree with your comment and have made it explicit in the document and our responses that all subsequent actions will have appropriate NEPA analysis and documentation.

Comment 27-5: That is our intent.

Comment 27-6: The identified standard and supporting guidelines identified in the preferred alternative in the FEIS meet these requirements.

Comment 27-7: BLM participated as a technical and policy advisor in the development of the California Rangeland Water Quality Management Plan for privately owned rangelands in which the National Resources Conservation Service's Field Office Technical Guides you suggest using for best management practices (BMPs) were incorporated. We have reviewed these Guides and, while the content and concept is very similar to those proposed to be used by BLM in California and Nevada, these guides are part of NRCS' policies and under its control to administer or modify. Therefore, we deem it best that BLM identify its own BMPs that are more applicable to BLM's programs and needs. We have adopted some of the ideas and concepts from these NRCS guides that are focused toward livestock grazing. The proposed BMPs for use by BLM in Nevada have already been incorporated as applicable for BLM management for that portion of Nevada administered by the Nevada State Director, and should also be applicable to those portions of northwestern Nevada administered by the California State Director.

Comment 27-8: We have incorporated these management concepts, much as you have suggested, in the preferred alternative.

Comment 27-9: We have incorporated your suggestions in the implementation and monitoring plans (Appendices 21 and 22) in the FEIS.

Comment 27-10: A cumulative impacts section has been added to the FEIS.

Comment 27-11: There are Native Americans on the Resource Advisory Councils (RACs) who were involved with developing the RACs' alternatives and in developing the preferred alternative in the FEIS. Specifically, the DEIS was sent to many of the tribes, and briefings have been held with tribal representatives when requested.

BLM is also in the process of establishing government-to-government relationships with tribes throughout California and northwestern Nevada, including talking with the tribes, developing consultation protocols, etc. The Field Offices are working to ensure that the tribes are involved in regional and local planning, and are consulting with them on issues that the tribes consider important, including actions that may affect collecting of traditional materials (foods, medicines, basketry, etc.) or otherwise affect traditional lifeways.

Comment 27-12: This is corrected in the FEIS.

Comment Letter 28 -- State of Nevada, Clearinghouse

Comment 28-1: Given the interest in noxious weed control and prevention, sections of the EIS that dealt with noxious weeds have been highlighted below:

Alternative 1: All three RACs addressed noxious weeds in their Standards, and the Ukiah and Susanville RACs also addressed them in their Guidelines.

Bakersfield

Species Standard Indicator: "Noxious and invasive species are contained at acceptable levels."

Riparian Standard Vegetation Attributes: "There is minimal cover of invader/shallow-rooted species."

Ukiah

Species Standard Indicator: "Non-native, noxious and invasive species are at acceptable levels."

Riparian Standard Indicator: "Shallow-rooted, invader plant species are not displacing native species."

Guideline 20: "Implement aggressive action to reduce the invasion of exotic plant species into native plant communities. Control the spread of noxious weeds through various methods such as grazing management, fire management, and other vegetative management practices."

Susanville

Biodiversity Standard Criteria: "Non-native plant and animal species are present at acceptable levels."

Guideline 10: "Aggressive action to reduce the invasion of undesirable exotic plant species into native plant communities will be taken. The spread of noxious weeds will be controlled through appropriate methods such as grazing management, fire management and other management practices."

Alternative 2: The State-wide Standards also address noxious weeds (the RAC Guidelines remain the same)

Riparian and Wetland Standard Indicator: "There is minimal cover of invader/shallow rooted species."

Species Habitat Standard Indicator: "Noxious and invasive species are contained at acceptable levels."

Alternative 3: The Fall-back Standards do not specifically address noxious weeds, but do address native species.

Native Species Standard: "Healthy, productive and diverse populations of native species exist and are maintained."

Alternative 4: The Rapid Improvement Guidelines address noxious weeds (the Standards are the same as Alternative 2).

Guideline 13: "Aggressive action will be taken to discourage the spread and infestation of weeds by livestock, such as the use of weed-free hay, livestock purging periods (Sheley 1995), and appropriate grazing management."

Alternative 5: The Preferred Alternative noxious weed sections are identical to Alternative 1.

As outlined in Section 4.2, "In all alternatives there would be a need to implement or install range improvement projects to facilitate the enhancement of vegetative conditions either through vegetative treatment practices and weed control or to place facilities on the rangelands to support the grazing management of livestock."

Section 4.2.2.1 addresses the difficulty of eradicating certain noxious weeds such as medusahead and yellow starthistle from infested allotments: "The long recovery times or high treatment costs associated with making significant progress in these weedy areas indicate that implementation of any of the alternatives would not significantly change this condition."

As outlined in Table 4.3.1, 22 allotments are in need of weed control, which "would be done using an integrated management approach which could include the use of herbicides, mechanical removal, prescribed burning, or the use of biological control agents."

Therefore, since all alternatives address noxious weeds, and controlling noxious weeds is recognized as a necessary action in at least 22 allotments, the differences in effects between alternatives would likely be minimal in regards to noxious weed control. In terms of introduction and/or spread, as riparian habitats move toward proper functioning condition, and as soil cover increases in uplands sites, it can be expected that fewer noxious weeds will be able to get established into new areas. Restoration of soil and vegetative conditions and the minimization of existing impacts will occur under all alternatives, but the time-frame will be shorter under Alternative 4.

See Appendix 17 for a short discussion of our existing noxious weed management program.

Comment 28-1a: Comment noted. The preferred alternative in the Final EIS is modification of Alternative 1 based upon public and agency comment, BLM analysis, and work with the RACs.

Comment 28-1b: They will be applied to that allotment, as well as all others in the Surprise Resource Area and other Resource Areas within the state.

Comment 28-2: The intent of the EIS is to provide a rational basis for the BLM to select a set of standards and guidelines applicable to livestock grazing administration. If it is determined that wild horse and burro use is a significant contributing factor that prevents an area from attaining or making progress towards attaining the standards, then a reasonable conclusion would be that a thriving natural ecological balance is not being maintained in that area. Therefore, the decision record and supporting NEPA documentation that adjusts the Appropriate Management Level of the wild horses and burros could cite as rationale that a thriving natural ecological balance was not being maintained in the Herd Management Area as evidenced in whole or in part by wild horse and burro impacts in the area contributing to the failure of the area to attain or make progress towards attaining the standards. This will occur on a case-by-case basis when all or parts of grazing allotments which occur in Herd Management Areas are determined not to be meeting the standards and that wild horses and burros are a significant contributing factor to this. How often these determinations will occur and to what extent this will affect wild horse and burro populations is not known at this time.

Comment 28-3: A complete allotment listing is in the implementation plan in Appendix 21. It is BLM's intent to meet the regulations by implementing actions on all allotments with known

problems prior to this grazing season. The major problems will be addressed within the first couple of years. However, there are a large number of allotments where we will have to evaluate what the exact problem is, whether or not it is caused by grazing practices, and what is needed to fix the problem. There are a number of allotments where we do not know the current condition. Many of these allotments were "C" allotments and have been ignored for years because of their low resource values, small size, etc.

Comment 28-4: See the monitoring plan in the FEIS (Appendix 22).

Comment 28-5: See response to comment 28-2, above. The Federal Land Policy and Management Act of 1976 is included as one of the authorities for this effort (see Appendix 3).

Comment 28-6: See the general response to process in this chapter, Section 5.4.1.

Comment 28-7: The guidelines cover a variety of conditions and situations. We believe that they already include the options you suggest.

Comment 28-8: We agree. This has been changed in the preferred alternative in the FEIS.

Comment 28-9: See the monitoring plan in the FEIS (Appendix 22). Although statistical analysis is appropriate for quantitative monitoring data, we do not believe such analysis is required to determine if significant progress is being made toward meeting standards. We think you are confusing statistical significance with biological significance. Given intensive enough sampling, even very small differences can be shown to be statistically significant; they may, however, have no biological significance.

We do not propose to tie the utilization levels given in the FEIS to yield index data. Rather, we will look for patterns of overuse (2 consecutive years or 2 years out of 5) and make management changes when we find these. We also intend to conduct research into stubble heights and minimum residue levels for upland perennial rangelands, with an eye toward using these to replace utilization levels. Once we have made this switch, precipitation will play much less a role in evaluating whether guidelines are being met (see the monitoring plan, Appendix 22, for more information).

Comment 28-10: It is unlikely we will receive funding for more than relatively small, site-specific ecological site inventories. See the monitoring plan (Appendix 22) for information on how we intend to monitor to see if we're meeting the standards and conforming to the guidelines.

Comment 28-11: Within workforce capabilities, BLM will continue to collect monitoring information including studies of grazing utilization, trends in range condition, actual use and climatic factors. At times, analysis and evaluation of these studies provide a clearly defined basis for establishing, changing or re-confirming an Appropriate Management Level that provides for a "thriving natural ecological balance" in harmony with other grazing uses including large wild ungulates and livestock. At other times, the analysis of the gathered information can result in a conclusion that grazing overuse is occurring and that accountability for such use is shared by both wild horses and burros and livestock, but that further differentiation relative to specific levels of overuse attributable to one group of animals and not the other is not possible. This often occurs where large wild ungulates, wild horses and burros, and livestock all make common use of and freely range over relatively large unconfined areas simultaneously. When this occurs, establishing the linkage of the actual use made by a specific kind of animal in a

specific geographic area at a specific time is difficult, if not impossible. Special studies intended to establish such linkages are labor- and time-intensive and often beyond the capability of field offices to undertake, given workforce demands relative to the funding available to carry out the entire gamut of BLM resource programs. Without this information, being able to determine specifically that an adjustment of the AML and not livestock practices, or vice-versa, is the appropriate action to eliminate the overuse is not possible. In these situations, BLM may employ a proportionate adjustment of permitted grazing use and wild horse and burro use. We remain open, however, to consider implementation of specific "special studies" the commentor contemplates and request that they refer them to us.

Comment 28-12: A listing of these allotments is in the implementation plan in the FEIS (Appendix 21). The criteria are generally built into the standards themselves (the "meaning that" and "indicated by" sections).

Comment 28-13: The proposed action is to adopt standards for rangeland health and guidelines for grazing management. The data used in the analysis are estimates developed solely for use in this analysis. Actual management actions will be developed on a site-specific basis for each allotment with input from interested and affected parties.

Comment 28-14: We realize that monitoring is necessary. See Appendix 22 for a discussion of monitoring in the FEIS.

Comment Letter 29 -- Organized Sportsmen of Lassen County

Comment 29-1: The Susanville RAC does have more members representing grazing permittees than other RACs in the State. There are also more grazing issues in this area, and the grazing interests' representation seems balanced by having wild horse and burro interests and environmental interests represented too. The RACs were developed to advise BLM regarding the development of land use plans and issues of resource management; their first assignment was to deal with the issue of rangeland health. They also have other interests, and depending upon the RAC involved, are currently discussing issues such as recreation fees, mining, and reclamation of damaged lands.

Comment 29-2: We agree that wildlife and recreation bring in a significant amount of money to the rural economies of California. This is stated in Section 3.8. We also agree that the total value of recreation to the local economies is considerably greater than the livestock industry contributes from grazing on BLM managed public lands. However, as this does not affect the impact analysis of developing rangeland health standards, we have not used it in our analysis.

Maintaining a healthy, viable, and diverse economy in the rural areas and communities surrounding the public lands is as important to public land management as maintaining a healthy, viable, and diverse ecosystem -- and the latter may well depend upon the first. The reality is that public lands are inextricably intertwined with private lands throughout the west. There are tremendous pressures on the private rangelands to be sold and developed for rural housing. These private lands often contain the primary water sources for wildlife (game and non-game species, migratory birds, special status species, etc.), livestock, and wild horses and burros. Habitat mitigation programs, food prices, water quality programs, recreation and tourism, and their fiscal impacts, are all affected by changes in the West's farm and ranch

situation. Maintenance of these private rangelands in their current status should be a prime consideration to all of those interested in maintaining healthy ecosystems.

Comment 29-3: See general response to impacts of other programs and uses in Section 5.4.1 of this chapter.

Comment 29-4: See general response to impacts of other programs and uses in Section 5.4.1 of this chapter.

Comment Letter 30 -- Glenn County Board of Supervisors

Comment 30-1: Comment noted.

Comment Letter 31 -- California Farm Bureau Federation

Comment 31-1: Your concern is noted. Others have expressed similar concerns or just the opposite, that there are too many ranchers on the RAC (note letter 29, comment 1). The future make-up of the RACs does not have an impact on this effort to develop standards and guidelines.

Comment 31-2: The current grazing regulations are the fallback standards and guidelines. See the general response to process in Section 5.4.1 of this chapter.

Previous grazing regulations have indeed resulted in improvements in rangeland health from the days prior to the Taylor Grazing Act.

Comment 31-3: Please keep in mind that the figures for AUM reductions are not actual determinations. These were used for purposes of analysis only to show the differences between alternatives. Any actual changes will be made on a case-by-case basis with input from interested and affected parties.

BLM disagrees with the comment that the economic analysis does not adequately deal with the economic impacts at the county level. The section in Chapter 4 dealing with impacts in the principal grazing counties is a very thorough analysis. The analysis particularly noted the potential impact to Modoc County because it is the most dependent on agriculture and is economically depressed.

In a worse case scenario of AUM reductions, the analysis projected a \$300,000 decrease of income in Modoc County. That decrease represents 0.2 percent of the total \$150 million dollar annual county income from all sources. These statistics do not come close to supporting a conclusion of dire consequences for the county or any of the towns in the county. Future changes in livestock prices will be a far more significant economic factor. As pointed out on pages 72-3 of Chapter 3, because of the drop in cattle prices from 1992 to 1995, livestock operations in Modoc County experienced a decrease of their livestock income of almost 60%! That percentage drop represented almost \$16 million dollars. A \$300,000 decrease is less than 2% of the real drop that occurred in those four years.

In response to issues raised in the public scoping process, BLM committed to a major level of effort to conduct a thorough economic analysis. The Modoc County Board of Supervisors' DEIS review letter states: "Overall, this is the best economic analysis done by a federal agency since Modoc County has begun reviewing projects." As discussed in the analysis, the economic viability of individual livestock operations is affected by a number of factors, including diversification of income, debt levels, efficiency and size of operation, etc. Because of this complexity, it is impossible to predict the future economic viability of individual livestock operations.

Comment 31-4: This could result in ranchers going out of business. However, if the affected livestock operations were sold, recent real estate history in NE California suggests that a ranch in that area would not be sold for development. As an example, historically, ranches that are sold in Modoc County have continued as agricultural operations. See the response to comment 1-59 and the discussion in the cumulative impacts section in the FEIS.

Comment 31-5: See the monitoring plan in the FEIS (Appendix 22).

Comment Letter 32 -- California Mule Deer Association

Comment 32-1: See the general response to process in Section 5.4.1 of this chapter. We essentially agree. The standards we are to develop are based on certain data and knowledge. There is some difference in semantics between the RACs, but little difference in the standards themselves. The same is true of most of the guidelines. The preferred alternative makes some significant changes to what was proposed in Alternative 1 for Susanville. And, implementation will vary somewhat between offices due to how they set their priorities and their funding levels. This lack of truly different options is one reason that many of the other BLM State Offices merely did an administrative determination or environmental assessment rather than an EIS.

Comment 32-2: Alternative 4 was driven by a more aggressive approach to a more rapid recovery. However this alternative was not chosen primarily due to lack of funding to implement it, and to the greater potential for economic impacts to the ranching community.

Comment 32-3: See the general response to process in Section 5.4.1 of this chapter.

Comment 32-4: The standards and guidelines are being applied to a large and extremely varied area and must, of necessity, be general in nature. It is expected and desired that they will be modified on a site-specific basis to consider local conditions (soils, climate, vegetation type, etc.).

Comment 32-5: See the monitoring plan (Appendix 22) in the FEIS.

Comment 32-6: See the implementation plan (Appendix 21) in the FEIS.

Comment 32-7: See response 10-7.

Comment 32-8: See the implementation plan (Appendix 21) in the FEIS.

Comment 32-9: Season of use is just one facet of grazing management. Assuming that "season-long" means "growing season-long" grazing, repeated grazing during the entire

growing season has often been harmful to riparian and upland rangelands. However, other factors, such as the severity of grazing use relative to the amount of plants grazed and the frequency that each plant is grazed, are equally important in influencing the health of a vegetative community. These factors must be considered in conjunction with the length of time and season to be grazed. There are situations where season-long grazing can sustain healthy rangelands providing all other grazing-related factors are managed for sustaining the desired vegetative community.

The guidelines allow the appropriate season of use to be determined and applied in any case when the standards are not being met. Where it is determined that season-long grazing is a contributing factor for not meeting rangeland health standards, modifications in the authorized season for use will be made.

Comment 32-10: They do, they are the "fallback" standards and guidelines from the regulations. They are currently in effect and discussions are underway with permittees and interested parties to make changes in allotments not meeting those standards. (See the implementation schedule in Appendix 21.)

Comment 32-11: The preferred alternative (Alternative 5) incorporates this requirement. See response 16-24.

Comment Letter 33 -- California Water Resources Control Board

Comment 33-1: The preferred alternative in the FEIS contains consistent standards and guidelines applicable for all three RAC areas. These standards specifically address meeting state standard requirements.

Comment 33-2: We have utilization guidelines for key upland perennial grass species and for key browse species in identified deer concentration areas; stubble height guidelines for herbaceous key species in riparian areas; utilization guidelines for key riparian shrubs and trees; and residual dry matter guidelines for annual grasslands.

Comment 33-3: The preferred alternative includes most of your suggestions, which are reflected in the standards and guidelines and in the modified set of proposed best management practices (BMPs) for grazing in California (Appendix 10). The standards, guidelines, and proposed BMPs in this alternative are consistent with California Rangeland Water Quality Management Plan certified by the State Water Resources Control Board and with the Coastal Zone Act Reauthorization Amendments guidelines issued by U.S. EPA.

Comment 33-4: The riparian standards from Alternative 1, slightly modified, are part of the preferred alternative.

Comment 33-5: See response 33-1.

Comment 33-6: They have not been chosen for the preferred alternative.

Comment 33-7: See response 33-3.

Comment 33-8: See response 33-3.

Comment 33-9: We recognize this responsibility.

Comment 33-10: We have done this in the preferred alternative in the FEIS.

Comment Letter 34 -- California Department of Fish and Game

Comment 34-1: The preferred alternative incorporates greater consistency of the standards and guidelines between the three RAC areas than those identified in Alternative 1.

Comment 34-2: See response to comment 10-33.

Comment 34-3: Overall, the condition of resources on publicly owned rangelands administered by BLM has improved considerably since the implementation of the policies to which you refer. We recognize, however, that there are some areas still needing attention, and that is the motivation behind this effort.

Comment 34-4: The preferred alternative includes a modification of the Susanville RAC standard from Alternative 1 that clearly indicates that state requirements are to be met.

Comment 34-5: In most cases, "significant" is a term that is defined by the local BLM manager, and will vary with the setting or location. It is basically determined by the degree of change, with the bottom line being: "are changes actually occurring?" The following would usually be considered when evaluating significance: 1) site potential -- unique characteristics of the geographic area (and will it change rapidly, or will changes take longer just because of the climate, soils, vegetative community, etc.); and 2) observable or measurable -- are the changes measurable, either quantitatively or qualitatively.

The Department of Fish & Game has been included in the past, and would continue to be included where it wishes in determining solutions to identified problems in concert with other interested and affected parties and in monitoring to see that implementation occurs, and that the implementation results in the desired changes. As a trustee agency, we rely heavily on its participation and advice regarding management of wildlife on public lands.

Comment 34-6: Assumption 10 does not indicate that removal of livestock would never be considered. It specifically states that arbitrary removal would not be done. There have been situations in the past where livestock removal has been the most prudent and effective means to accelerate the recovery of a specific area or sensitive resource, and we will continue to apply this where it is the most viable alternative. Total grazing exclusion, however, is usually not necessary for most situations. Changing the grazing levels, the season of use, or the management strategy usually results in successfully meeting recovery goals.

Comment 34-7: We believe we have addressed the viability of native plant and animal communities in the standards and guidelines. With respect to native plant communities, the preferred alternative (Alternative 5), provides standards in all three RAC areas that relate to plant species diversity, to maintaining a variety of age classes, to keeping levels of noxious and invasive plants low, to maintaining adequate organic matter (litter and standing dead plant material), to plant vigor, and to allowing for reproduction and recovery from localized catastrophic events. All of these are pertinent to the viability of native plant communities.

Viability is included in the species indicators for special status species and other managed species. An additional indicator for wildlife species is being added to the preferred alternative.

Comment 34-8: See response to 34-4.

Comment 34-9: The intention of the statement was not to indicate that BLM would not consider recovery strategies for all degraded rangelands, but that areas where the predicted recovery capabilities are either lost or are extremely low will be of low priority for implementation. For some sites the potential for recovery was lost many decades ago and unless a particular land use such as grazing is further aggravating the situation, excluding the use, depending upon how it is currently managed, may not result in any positive change in conditions.

Comment 34-10: Although the specific language of the proposed standards and guidelines was developed at the local level and with consideration for local application, the fundamentals of rangeland health and the guiding principles for which the standards and guidelines are being developed are national in scope as directed by the regulations and introduced through the Rangeland Reform 94 effort. Using the NEPA process, such as the development of this particular EIS, provides opportunities for the entire public to have a voice in developing the standards and guidelines.

Comment 34-11: The following indicator has been added to all three standards in the preferred alternative in the FEIS: "Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations."

Comment 34-12: The wording of the water quality guidelines have been changed for the preferred alternative and no longer include the words "promote compliance."

Comment 34-13: The standards are not worded consistently among the RACs, but the fundamentals of riparian function are included in each. The requirement of proper functioning condition (PFC) that is included in each alternative promotes the same fundamental measures included in Rangeland Health (e.g., erosion, sedimentation, distribution of plants, root distribution, age-class distribution, plant vigor).

Comment 34-14: We have added stubble height guidelines for herbaceous riparian plants. In the annual grasslands we have residual dry matter guidelines. In upland perennial grassland communities we have utilization guidelines; we intend to change these to stubble height and residue guidelines once we have conducted the necessary research (see the monitoring plan in the FEIS, Appendix 22). The soil standard also includes an evaluation of plant cover. This, in combination with the species standard, will promote adequate ground cover for many ground nesting species (however, many species have conflicting requirements -- examples being horned larks versus meadow larks). The requirements for adequate nesting cover should be considered at the allotment level when specific objectives are identified. CDFG is, and will be, encouraged to participate in these efforts.

Comment 34-15: Periods of rest are included in each RAC proposal and alternative, and are thus not precluded as a management tool. The application of rest as a management action will be decided at the allotment level, as needed to meet or maintain rangeland health standards and desired plant communities, regardless of threshold or functioning condition.

Comment 34-16: The other RACs did not suggest adding this guideline to the preferred alternative. The intent of this guideline is a standard policy for BLM.

Comment 34-17: See response 34-6. Site capability and potential is assessed using a variety of comparisons between current vegetation and soil conditions against relic and/or undisturbed (long term) sites. In the absence of such sites, grazing exclosures will be constructed at a size required to evaluate long term changes that may help indicate potential and capability.

Comment 34-18: The BLM will encourage cooperating agencies, such as CDFG and NDOW, to assist in aquatic assessments as part of our monitoring plans. Please see the monitoring plan in Appendix 22.

Comment 34-19: Yes, it is general. Site specific standards will be developed as needed at the local level.

Comment 34-20: See response 34-4.

Comment 34-21: We disagree. The standard states that riparian areas will be properly functioning. It is not appropriate in a standard to say that they will be making progress toward being properly functioning. Alternative 5, the preferred alternative has also added the statement that riparian areas will meet management objectives.

Comment 34-22: The soil and species standards consider vegetation cover, composition and structure. The guidelines include minimum levels of residual matter or maximum perennial plant utilization that are surrogates for levels of ground cover. The particular level above these minimums will be determined at the allotment level where objectives for ground nesting wildlife may be included through input from BLM, the operator, CDFG (or NDOW) and the public.

Comment 34-23: Chapter 3, Section 3.4.3, includes a description of impacts to water quality that may occur from livestock grazing activities. Implementing best management practices such as those proposed in Appendix 10 should help mitigate any impacts to streams. Monitoring strategies will need to be developed for each given situation, depending upon specific impacts or threats of degradation for any particular site or water body.

Comment 34-24: The preferred alternative in the FEIS includes guidelines for utilization of key riparian trees and shrubs (5-20%) and for upland browse species in identified deer concentration areas (20%). Also see the responses to comments 15-7 and 16-8.

Comment 34-25: A stubble height of 4-6 inches is included in the preferred alternative for those areas not meeting the riparian standards. An alternative stubble height may be determined at the allotment level to meet the functional requirements of plant vigor, bank protection, and sediment entrapment that would meet the streams, riparian and wetland sites, and biodiversity standards.

Comment 34-26: Not all fish habitats in northeastern California are fragile. Where they are fragile, BLM will require whatever measures are necessary to protect them.

Comment 34-27: A number of indicators have been selected to monitor the effects of hoof action on watershed function. PFC includes an assessment of bank stability. On the PFC

Standard checklist, question 11 asks: "Is adequate vegetative cover present to protect banks and dissipate energy during high flows?"

The impacts of hoof action on stream banks and flood plains are addressed in riparian guidelines which require "root masses sufficient to stabilize stream banks," "80% vegetative cover," "adequate stream bank stability," "sufficient herbaceous forage biomass to meet the requirement...bank protection...", and "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks...."

Comment 34-28: See response 10-23.

Comment 34-29: Periods of rest from grazing may be implemented at all scales varying from broad landscapes to relatively small sites. The scale and the timing of the rest will be determined based upon evaluations of the specific rest needed to sustain or regain the health of the vegetative community and other attributes.

Comment 34-30: Except in limited situations, desired species will be local ecotypes of native grass, forb, shrub, and tree species. The limited situations include existing seedings of introduced perennial species such as crested wheatgrass where those introduced species may be desired. The exact species that will be managed for will be determined on a site-specific basis through a land use plan or at the allotment level, with public involvement.

Comment 34-31: Where it is the BLM's responsibility to determine and provide for habitat requirements on public lands, we expect to make these determinations in full consultation with the state departments responsible for the wildlife species as well as other organizations and publics interested in the welfare of wildlife.

Comment 34-32: As outlined in BLM's California Vegetation Management Final Environmental Impact Statement (August 1988), "Site-specific environmental analysis and documentation will be prepared at the district or resource area level on each proposed site-specific vegetation control plan. During site-specific analysis and documentation, public involvement will occur in accordance with the CEQ Regulations for implementing NEPA."

Comment 34-33: BLM's policy is to include fish and wildlife needs when planning and designing any water developments. The fundamentals of rangeland health and the guiding principles for developing rangeland standards and guidelines include providing for the needs of wildlife and quality habitat for native animal populations and communities.

Comment 34-34: The Preferred Alternative in the FEIS includes the utilization guidelines recommended by Holechek (1988, 1991, 1998). We will apply these to all allotments not meeting or making significant progress toward meeting one or more standards. See response to Comment 34-24.

Comment 34-35: These areas are located in northwestern Nevada and have been identified as areas where deer concentrate during the most severe winter periods.

Comment 34-36: At this time there are no allotments within the EIS area that are administered specifically as ephemeral range. If BLM determines in the future to manage an area as ephemeral range, then management guidelines generated as terms and conditions for authorizing grazing on an ephemeral basis would be in order.

Comment 34-37: The intent of Alternative 2 is to serve as a state-wide set of standards and guidelines for rangeland health. A preamble is not required, but the RACs wished to express some of their philosophy (in Alternatives 1 and 5) of what standards are and how they should be implemented.

Comment 34-38: The standard is fully functioning. If they are not fully functioning (in proper functioning condition or PFC), then we want them to be in an upward trend. However, the goal is fully functioning, not just an upward trend. This goal is in the preferred alternative.

Comment 34-39: See response 34-4.

Comment 34-40: The preferred alternative in the FEIS has a number of significant changes for the Susanville RAC area. See especially the water quality standard, and guideline 16.

Comment 34-41 & 42: These guidelines are now in effect under the regulations. However, they are not the preferred alternative in the FEIS as we, too, recognize their weaknesses.

Comment 34-43: This has been corrected in the FEIS.

Comment 34-44: Implementation will be completed as rapidly as funding and personnel allow, and it will be done in consultation with other agencies, and interested and affected parties. See the implementation plan in Appendix 21.

Comment 34-45: See response 34-4.

Comment 34-46: We agree that these methods are effective. Review of the literature (see the discussion of utilization in Appendix 20) shows that there is no substitute for reducing grazing pressure when an area is overgrazed.

Comment 34-47: Category "I" allotments are those allotments specifically targeted as needing improvement. The two descriptions are not contradictory as both identify that allotments in this category need improvement and are the first to be considered for management.

Comment 34-48: This has been changed in Chapter 3.

Comment 34-49: The section included an assessment using the CWHR program to describe the numbers of wildlife, by class, in table 3.5.1.

Comment 34-50: If wild horse and burro populations are causing the problem in an allotment, action will be taken to fix the problem, including herd reductions if appropriate. If domestic livestock grazing is causing the problem, then actions will be taken to fix the problem, including reductions of stocking rates, changes of season of use, etc., as appropriate.

Comment 34-51: You are correct in that no specific action is prescribed. Those actions will be determined on a case-by-case basis for each allotment. The guideline is that the actions will result in complying with the utilization and other criteria to move toward meeting the standards.

Comment 34-52: Your reviewer did not read the entire paragraph. There are those who enjoy seeing cattle on open range (an excellent example is the great number of tourists who stop in the Owens Valley to photograph the cattle along Highway 395), and there are those who do not

enjoy seeing cattle. There was no argument in the paragraph to accept any negative ecological impacts of grazing -- it was a simple factual statement.

Comment 34-53: See general recreation response in section 5.4.1 of this chapter.

Comment 34-54: See response 10-33. In some areas, there are positive effects of grazing -- it has been and can be used to achieve management objectives. In many areas there are negative effects of grazing. The objective of this EIS is not to debate the merits of grazing, but to establish standards for rangeland health, and guidelines for grazing that will enable us to meet those standards where there are problems.

Comment 34-55: There is adequate description to see the differences between the RAC's proposals; see especially Appendices 14 and 15. The major differences have been eliminated in the preferred alternative.

Comment 34-56: Other than water quality, the Susanville RAC standards and guidelines identified in Alternative 1 include, at least indirectly, the attributes relating to the fundamentals of rangeland health within the descriptions of the standards. The water quality standard has been modified to reflect these requirements in the preferred alternative.

Comment 34-57: While we have not studied grazing exclusion on a large-scale, we have seen no evidence to suggest it would result in a decrease in medusahead. The Alturas Resource Area has an exclosure near Adin that Dr. Jim Young (USDA, Agricultural Research Service, Reno, Nevada) set up about 20 years ago. He predicted that medusahead would increase and it has. There are other exclosures in the Fall River Mills area that are also infested with medusahead. Sheep Springs Valley was excluded from livestock grazing in about 1988-89. Medusahead is invading the area and not only infesting the clay sites but also the loam sites. Two allotments in the Eagle Lake Resource Area, the Snowstorm and Tablelands allotments, have about 15,000 acres and 29,000 acres of medusahead dominated rangelands, respectively. There are two permanent livestock exclosures in those allotments that have been maintained for over 20 years. Density of medusahead is similar within these exclosures to the areas outside of the exclosures. Although the vigor of remnant perennial grasses is higher within than without the exclosures, the density of these grasses is similar within and without. This suggests that the very high density of medusahead plants within the interstices between the perennial grasses is inhibiting perennial seed germination and/or recruitment. As grazing systems that allow for rest during the growing season and more restrictive livestock utilization levels on key perennial grass species are instituted in allotments with medusahead, the vigor of perennial grasses should more closely approximate that observed within exclosures. There appears to be no cost-effective solution available, however, to displace medusahead with native perennial plants.

Comment 34-58: Due primarily to lack of funding, Alternative 4 is not considered a doable alternative. The preferred alternative has similar standards and guidelines, yet would be implemented within available budgets, and is therefore considered a better alternative.

Comment 34-59: We have instituted more restrictive utilization guidelines (see FEIS Alternative 5, Susanville RAC, and responses to comments 4-4 and 16-7).

Comment 34-60: See response 34-58.

Comment 34-61: You may have taken the statement out of context. The statement in Chapter 4, page 8, was that changes would occur fastest under Alternative 4 and Alternative 1 and 2 for Bakersfield. We then stated that Susanville under Alt. 1 and 2 would likely change faster than Ukiah under those same alternatives because of its interim guidelines. There is no inconsistency with a rapid-improvement alternative.

Comment 34-62: The "major work" referred to in this section does not mean work required to reduce or exclude livestock. It refers to major investments of time and money in restoring areas through efforts such as burning, reseeding, or the use of herbicides or mechanical tools. The areas referred to are those that have been severely degraded by past destructive overgrazing (mostly before passage of the Taylor Grazing Act of 1934) and which will either not recover or take a long time to recover, regardless of whether livestock numbers are decreased or grazing eliminated entirely. Some areas have probably fallen to a steady-state from which they will never recover naturally, at least not in time frames that are meaningful to management.

Comment 34-63: Chapter 4 of the FEIS identifies these differences and concludes that the preferred alternative should be the most effective for improving riparian conditions and water quality.

Comment 34-64: We see an improvement in rangeland health under all alternatives, with a resultant improvement in habitats for most species. Specific objectives for plant community types and habitat will be made at the allotment level, and could affect the level of habitat improvement for a specific species.

Comment 34-65: The DEIS stated that recreational opportunities would improve with improve health of the ecosystem. Specific opportunities were not addressed due to the general (non site-specific) nature of the EIS. See the general recreation response in section 5.4.1.

Comment 34-66: We agree that the direct economic benefits of recreation on public lands is greater than the direct economic benefits of grazing. However, there are indirect benefits that must also be considered. We have added some information to Chapters 3 and 4 addressing the economics and other benefits. See responses 10-33 and 29-2.

Comment 34-67: We agree that the alternatives are very similar. No action in this case is still a change from previous management (see the process discussion in Section 5.4.1 of this chapter). The "fallbacks" are currently being implemented until new standards and guidelines specifically for California and NW Nevada are developed. As the goals are similar, as well as many of the means of achieving those goals, it is not illogical that the potential reductions in AUMs is similar between alternatives.

Comment 34-68: Alternative 4 has not been selected as the preferred because BLM does not (and will not) have the money available to implement it, and therefore it is not an alternative that can be implemented. Under current funding levels, the preferred alternative in the EIS will be implemented as rapidly as possible, and should achieve similar results, albeit a bit slower. See Appendix 21 for the implementation schedule.

Comment 34-69: This information is contained in Chapter 3 in the discussion of PFC, pages 38-40.

Comment 34-70: See response 34-68.

Comment 34-71: See response 34-6 and 57.

Comment 34-72: As stated in Chapter 4 of the DEIS, pages 21 and 24, it may take up to 15 years to complete all of the implementation actions needed to restore rangeland health with all alternatives, except Alternative 4 (potentially only 5 years). Actual full recovery of rangeland health, however, may take much longer, depending upon the recovery capabilities of each site. Recovery efforts have already been started for some allotments determined not to meet one or more of the standards due to existing grazing activities. These are under the fallback standards, which became effective in August 1997.

Follow-up monitoring will be conducted to determine the progress of the implementation, the progress of recovery, and the effectiveness of the management measures. When it is determined that progress is not being made or being made as fast as predicted, then modifications will be considered and implemented, using the same processes used for making the initial determinations. See the implementation schedule in Appendix 21, and the monitoring plan in Appendix 22.

Comment 34-73: See response 34-68.

Comment Letter 35 -- Shasta County Board of Supervisors
(5 letters)

Comment 35-1: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs.

Comment Letter 36 -- Roger Peterson

Comment 36-1: We have employed the utilization levels recommended by Holechek (Holechek 1988, 1991, and 1998), but have added some flexibility in implementing these, by, among other things, making management changes only after two consecutive years (or two years out of five) of exceeding the recommended levels in any key area (see, for example, Alternative 5, Susanville RAC Guideline 16; see also our responses to comments 4-4 and 16-7). With respect to the use of stubble height in upland perennial grassland communities, please see the response to Comment 11-1.

Comment 36-2: We agree with your assessment of biological diversity as it relates to succession on rangelands. Please see our response to Comment 4-8 for more information on our position.

Comment Letter 37 -- Robert Schluter

Comment 37-1: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs. Guideline 14 has been dropped from this alternative and replaced with Guideline 16. Guideline 15 is now 17, and has been slightly modified.

Comment 37-2: Comment noted.

Comment Letter 38 -- Central Coast Regional Water Quality Control Board

Comment 38-1 & 2: BLM fully recognizes its requirement to meet state water quality standards includes compliance with the Regional Water Quality Control Board's Plans and other approved Basin Plans identifying water quality standards in California. Grazing will be managed to adhere to these standards.

Comment 38-3: We understand that applying BMPs in themselves does not ensure that water quality standards will be met; that BMPs are intended to be a listing of practices that, when appropriately applied, should help protect non-point sources of pollution from being discharged into water bodies. Follow-up monitoring will help determine the effectiveness in implementing the BMPs and to determine if the BMPs need to be modified.

Comment Letter 39 -- Willy Hagge

Comment 39-1 & 2: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs. Guideline 14 has been dropped from this alternative and replaced with Guideline 16. Guideline 15 is now 17, and has been slightly modified.

Comment 39-3: The criteria states that a high degree of shading reduces icing in winter. It is not that a high degree of riparian shading reduces icing, but the fact that the lack of riparian vegetation will often allow the stream to widen and become more shallow, and therefore it will freeze faster. Thus, more riparian vegetation is a stabilizing influence to maintain channel depth, thus reducing icing.

Comment 39-4: We agree that many of the habitats that have experienced juniper encroachment can be improved by fire and other means. The two sentences to which you refer are meant to apply to sites that have lost sufficient topsoil to have changed their capability from what it once was. This would not apply to areas supporting junipers unless severe erosion has taken place.

Comment 39-5: We believe we have offered field managers sufficient flexibility in implementing these standards to achieve real results on the ground.

Comment 39-6: There is no direct correlation between water quality and water rights, other than an indirect consequence of impaired water quality potentially affecting the beneficial use of the water, which in turn, in some instances, could affect the security of the water rights through continued non-use. An example might be a municipal water source which became impaired and could no longer be used for that purpose; in this case the water rights may become jeopardized through non-use. BLM, however, does not have jurisdiction or authority over water rights, but is required to meet state water quality standards which may or may not possibly influence water rights.

Comment 39-7: The desired seral state or desired plant community is a management goal that needs to be determined for all rangelands. Without that goal, there is no logical way to evaluate existing conditions or to determine if changes are needed, or what those changes should be. The desired seral state for any allotment is determined by the authorized officer through

consultation and coordination with permittees, interested publics and other agencies during the planning process (allotment plan or other land use plan).

Comment 39-8: This intent has been retained in the preferred alternative.

Comment 39-9: This has been retained in the preferred alternative.

Comment 39-10: This guideline has been retained in the preferred alternative.

Comment 39-11: See responses 1-22 and 60.

Comment 39-12: See response 39-1.

Comment 39-13: Impacts for individual members of the ranching community will ultimately be determined on a site-specific and case-by-case basis, just as the grazing management changes needed will be determined for each allotment individually. As stated, there may be some ranchers that might go out of business, or who may have to obtain additional sources of income. The anticipated costs to most individual ranchers and to the ranching communities associated with developing and implementing the standards and guidelines will be short term and relatively minor. In the long term, the benefits of healthy rangelands for viable ranching operations (increased productivity) should far outweigh the short-term costs.

Comment Letter 40 -- Stephen C. Nelson, Nelson Ranches

Comment 40-1: You are correct. We have added a cumulative impacts section to the FEIS.

Comment 40-2: Comment noted. The discussion on utilization levels and the annotated bibliography were generated by just such a concern and desire.

Comment 40-3: This is retained in the preferred alternative in the FEIS.

Comment 40-4: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs. Alternative 4 has not been selected as the preferred because BLM does not (and will not) have the money available to implement it, and therefore it is not a viable alternative.

Comment 40-5: The water quality standard has been changed in the preferred alternative.

Comment 40-6: Desired plant communities are a management goal and decision that are made through a public planning process. This can be through an allotment planning process, CRMP process, or other land use plan. The RAC wanted to ensure that BLM would make such decisions with public input into the planning process, and the allotment management plan was the most appropriate tool.

Comment 40-7: This has been retained in the preferred alternative in the Final EIS.

Comment 40-8: See responses 1-22 and 60.

Comment 40-9: See response 40-4.

Comment 40-10: Chapter 4 has been modified in the FEIS to address some of the issues. See response 39-13.

Comment 40-11: See response 1-62.

Comment 40-12: We believe we have offered field managers sufficient flexibility in implementing these standards to achieve real results on the ground.

Comment Letter 41 -- George Bailey, Jr.

Comment 41-1: See response 16-6. Due to the large area covered by the standards and guidelines, they must be general in nature. It is our intention that they be modified to fit local situations and conditions; and that they be implemented using a common sense approach.

Comment 41-2: BLM is well aware of and concerned about economic impacts to the ranching community and rural communities, and reasonable management flexibility will be considered in the development of terms and conditions for authorizing grazing. There may be situations, however, when there will be no option other than to incorporate management measures that may be economically harmful to a livestock operator in order to achieve or sustain rangeland health. Economic impacts will be considered along with ecological impacts in determining the management measures to be applied to any allotment.

Comment 41-3: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs. Alternative 4 has not been selected as the preferred because BLM does not (and will not) have the money available to implement it, and therefore it is not a viable alternative. Also see responses 1-22 and 61.

Comment 41-4: The reduction of AUMs and the estimated amount of reduction in the DEIS was used for analytical purposes only, and reflects an estimation of what may happen as a consequence of implementing any of the alternatives. There has been no decision made at the state level that this level of reduction will occur. Site-specific assessments, evaluations and management decisions will be made at the allotment level in consultation with the permittee(s) and interested publics and agencies. Until this is done, we do not know what AUM adjustments will be required. And, you must realize that AUM adjustments are often mobile, either upward or downward, depending upon vegetative conditions, responses to management, and changing rangeland resource values. AUM adjustment is only one of many management measures that may be applied if needed.

Comment 41-5: Site-specific assessments, evaluations and management decisions will be made at the allotment level in consultation with the permittee(s) and interested publics and agencies. If these determinations are not agreed upon by all parties, a proposed management decision will be rendered which can be protested and appealed by the rancher or other affected party when it becomes a final decision. The appeal process is described in the Code of Federal Regulations, Title 43, Part 4100 (43 CFR 4100).

Comment 41-6: Specific standards for water quality vary dependent upon the water body. For Nevada, they are identified in the State Water Quality Regulations. For California, they are in each of the Regional Water Quality Control Boards' Basin Plans. This information is too

voluminous to include in the EIS, and since the analysis is not site-specific, the information would not be that useful. The specific standards will be considered when making assessments and management determinations at the allotment level.

Comment 41-7: In conformance with State law, there are exceptions from meeting drinking water standards identified for stockwater developments with small volume discharges in both California and Nevada. See the water quality standards in the preferred alternative.

Comment 41-8: Your suggestions regarding prescribed fire are quite applicable to planning and designing prescribed fire projects.

Comment 41-9: The BLM is committed to improving and maintaining riparian areas so that they meet the standards of healthy rangelands. Stubble height guidelines are a tool to ensure this. Where these guidelines are not being met, management actions will be implemented. This may include fencing and development of alternative water sources, but they may include other actions, such as development of riparian pastures, herding, spring-only grazing, or late-season grazing (when willows are not an important component of the system; see Elmore and Kauffman 1994). Riparian key areas will be used to evaluate management of riparian areas within particular allotments or pastures.

Comment 41-10: It would be very unusual that grazing would be removed from an entire allotment in order to restore a small riparian area under any of the alternatives. However, it would be more apt to be applied in isolated cases if the concept of rapid recovery was used, and if complete removal of grazing was the only viable means to restore an area as fast as possible.

Comment Letter 42 -- Modoc County Cattlemen's Association

Comment 42: See the responses to letter 39.

Comment Letter 43 -- Ken McGarva, McGarva Ranch

Comment 43-1: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs.

Comment 43-2: That guideline has been dropped from the preferred alternative in the FEIS and replaced with Guideline 16. See response to comment 10-28.

Comment 43-3: We believe we have offered field managers sufficient flexibility in implementing these standards to achieve real results on the ground.

Comment 43-4: This guideline is included in the preferred alternative in the FEIS, with some wording changes. Also see the monitoring plan in Appendix 22 of the FEIS.

Comment 43-5: See response 31-3.

Comment 43-6: Although BLM cannot guarantee that there will be no economic hardships caused by implementing the standards and guidelines, every attempt will be made through

consultation with the affected permittee and other interested parties to implement actions that will have as little adverse economic impact as possible while still resulting in meeting the standards.

Comment Letter 44 -- John Espil Sheep Company, Inc.

Comment 44-1: The Federal Land Policy and Management Act of 1976, Sections 202 and 402, direct the BLM to determine through the land use planning process those areas available for livestock grazing. This pertains to all public lands, including those lands located in a Grazing District designated under the authority of the Taylor Grazing Act.

Comment 44-2: The grazing regulations allow the authorized officer to make changes in permitted use based on monitoring, field observations, ecological site inventory, or other acceptable data (43 CFR 4110.3). Where necessary, changes will be made based upon documented observations, including assessments made by interdisciplinary teams (see the monitoring plan in Appendix 22).

Comment 44-3: Implementation refers to all phases, starting with initial assessments and through follow-up monitoring. See the implementation and monitoring plans in the Final EIS, Appendices 21 and 22.

Comment 44-4: See the general response to impacts from other programs and uses in Section 5.4.1 of this chapter.

Comment 44-5: See the general response to process in Section 5.4.1 of this chapter, where it talks about the no action alternative.

Comment 44-6: We will base our decisions on all available information.

Comment 44-7: See response 26-2.

Comment 44-8: The entire implementation process will be open to public participation. Initial prioritization has been done (see Appendix 21) to begin scheduling known problems to meet the regulatory requirement that BLM take action prior to the next grazing season in those areas where we know a problem exists. These listed priorities may change.

Comment 44-9: See the monitoring plan in Appendix 22.

Comment 44-10: You are correct that "trend unknown" should have a different position on the flow chart. The flow chart has been corrected.

Comment 44-11: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs.

Comment 44-12: Although the premise that erosional features are natural is true, the distribution and severity which these erosional features exhibit across a landscape are important, measurable indicators of watershed health. Neither BLM nor the RACs intend to use evidence of historical erosion to modify grazing practices. However, evidence of active, accelerated erosion should be used in conjunction with other indicators of watershed function to

assess the current trend and overall watershed health. Reviews of the scientific literature consistently report that soil erosion increases with livestock grazing (Belsky and Blumenthal 1995; Fleischner 1995; Bari et al. 1995).

Comment 44-13: We disagree that infiltration and permeability are unrelated to species vigor and diversity, potential natural vegetation, and desired plant communities. Infiltration rate and permeability are terms used to describe the rate at which water enters the soil surface and is transmitted through the soil. Factors which influence these complex physical and chemical phenomena are soil porosity, structure, bulk density, crusts, texture, reaction, surface and subsurface vegetation. Focusing on the comment, surface vegetation and plant roots are the primary sources of surface litter and soil organic matter. Organic matter improves soil structure and water holding capacity, and infiltration (Brady 1984; Roberson, et al. 1991). Litter and soil organic matter also help soils to resist erosion, compaction and deformation (Batie 1984; Ellison 1960; Ratliff 1985; Tisdale et al. 1985). Since soil structure and the stability of that structure strongly influence water infiltration and transmission rates, then the role of vegetation types and rooting depths are important to long term watershed function because of the interdependent and complex interaction of vegetation, soil properties and water movement.

In the sagebrush steppe vegetation type, the variety of rooting depths provided by healthy, diverse stands of perennial shrubs, grasses, and forbs can help anchor soil better than monocultures of cheatgrass. The layering of vegetation provides a greater degree of protection against wind and water erosion. Furthermore, in drought years cheatgrass cover can be greatly diminished compared to the cover provided by healthy bunchgrasses.

Comment 44-14 & 15: See the discussion of PFC in Appendix 23. These indicators come from the PFC checklist. PFC is a qualitative method based upon the best riparian and aquatic science available.

Comment 44-16: These exceptions are retained in the preferred alternative.

Comment 44-17: We have changed the standard to include "desired." We have further clarified it by adding the word "viable."

Comment 44-18: We have not modified this guideline in the preferred alternative.

Comment 44-19: The utilization guidelines you suggest are too severe to maintain or improve riparian vegetation.

Comment 44-20: We have not modified this guideline in the preferred alternative.

Comment 44-21: We have not modified this guideline in the preferred alternative.

Comment 44-22: See the response to comment 10-11.

Comment 44-23: The entire concept of grazing systems (see any range management textbook, such as Holechek et al. 1998 or Vallentine 1990) is predicated on providing rest to perennial plants during their period of active growth in some years. See the response to Comment 21-8.

Comment 44-24: We have not modified this guideline in the preferred alternative.

Comment 44-25: The guideline states "potential natural vegetation *or* desired plant community." [Emphasis added.] This gives managers the flexibility to determine, in collaboration with the public, whether to manage for potential natural vegetation or a different desired plant community. It is not true that desired plant communities have been determined in all cases. This is something that will be determined on an allotment basis. See the response to comments 4-7, 7-3, and 11-12.

Comment 44-26: The Susanville RAC suggested retaining this guideline as worded, and we have not modified it in the preferred alternative.

Comment 44-27: Although the guideline may not be directly related to the authorization and management of livestock grazing, the Susanville RAC suggested retaining this guideline as worded, and we have not modified it in the preferred alternative.

Comment 44-28: The Susanville RAC suggested retaining this guideline as worded, and we have not modified it in the preferred alternative.

Comment 44-29: This guideline has been eliminated from the preferred alternative and replaced with Guideline 16. See response 10-28.

Comment 44-30: Specific reference to the Landscape Appearance Method has been removed from the preferred alternative (Alternative 5) in the FEIS. However, the method remains one of those available to BLM personnel to measure utilization. See the response to Comment 4-11 and the monitoring plan in Appendix 22.

Comment 44-31: We disagree with you. See response 44-19. Also see the general response on utilization in Section 5.4.1 of this chapter, the complete discussion on utilization in Appendix 20, and the Annotated Bibliography on Utilization.

Comment 44-32: Alternative 2 was not selected as the preferred alternative. The preferred alternative (Alternative 5 in the FEIS) is similar to Alternative 1, with changes suggested by public input, further research by BLM, and discussions with the RACs.

Comment 44-33: Alternative 2 was not selected as the preferred alternative in the FEIS.

Comment 44-34: Cryptogamic soil crusts are referenced in the Bakersfield and Ukiah RAC indicators of soil physical characteristics. Natural soil crusts help stabilize the soil surface, reduce surface erosion, and promote water infiltration. Although the commentor may be correct about the lack of a description format or protocol in the SCS Range Site Description format, this ecological site property is recognized and described as part of a technical soil pedon description. Since soil crusts are an important characteristic in some arid and semiarid environments, it is important to recognize their occurrence and natural distribution and to not overlook the diagnostic clues they may yield when assessed along with numerous other indicators of watershed function.

Comment 44-35: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs. See responses 1-22 and 60.

Comment 44-36: Removal of livestock is not necessarily the "cure" for recovering rangeland health and there are situations in which properly managed livestock grazing may be an important tool for managing vegetation. However, there are some situations where complete removal of grazing from a site, at least temporarily, is the only viable means to obtain restoration for a particular site.

Comment 44-37: See the discussions on utilization in Appendix 20, the general response to utilization in Section 5.4.1 of this chapter, and the Annotated Bibliography.

Comment 44-38: Alternative 4 is not the preferred alternative in the FEIS.

Comment 44-39: Comment noted.

Comment 44-40: Comment noted.

Comment Letter 45 -- Ukiah Resource Advisory Council

Comment 45-1: A monitoring component has been added to the FEIS (Appendix 22), which includes means for monitoring the effectiveness of the standards and guidelines.

Comment 45-2: The preferred alternative in the FEIS is Alternative 5, a modified version of Alternative 1, based upon public input, further analysis by BLM, and discussions with the RACs.

Comment Letter 46 -- Lassen County Farm Bureau

Comment 46-1: The standards address ecological components that are affected by all uses of the public rangelands, not just livestock grazing. However, the scope of grazing regulations made effective on August 21, 1995, and of the alternatives analyzed in the EIS are limited to grazing administration. See the general response to Impacts from Other Programs and Uses in Section 5.4.1 of this chapter.

Comment 46-2: See response 44-36.

Comment 46-3: The social and economic impacts to rural communities was considered in the development and selection of the preferred alternative.

Comment 46-4: The initial indications that a particular area of rangeland is or is not meeting rangeland health standards may come from various sources. The actual determination that an area or allotment is meeting the standards, or is not, will be made with opportunities for the permittee and other interested parties to participate in the determination and to help develop corrective measures.

Upon determining that an allotment does not meet the standards, BLM is required to implement management changes prior to the next grazing season. As most existing leases and permits will not conveniently expire at that time, we will have to modify some leases and permits prior to their renewal dates. The decision-making process, including NEPA, and opportunities for permittee and public participation will continue.

Comment 46-5: Stubble height has been carried forward into the preferred alternative. See response 10-22.

Comment 46-6: See response to Comment 10-28.

Comment 46-7: These standards and guidelines are currently in effect. They are not the preferred alternative, and will be replaced upon approval of these new standards and guidelines.

Comment 46-8: We disagree. This alternative uses the assumption that removal of livestock is a management action that can be implemented more rapidly, and assumes that livestock would be removed until other actions (such as fencing, etc.) could be implemented.

Comment 46-9: The guideline has been almost completely rewritten for incorporation into the preferred alternative.

Comment 46-10: Implementation will be done with a common sense approach. It is expected that the guidelines will be modified for site-specific application. Until modifications are made based upon local conditions (climate, soils, vegetative community), this stubble height will be used.

Comment 46-11: This is noted in Chapter 3.

Comment 46-12: These impacts are noted. However, the thrust of this effort is grazing management. See the general response to impacts from other programs and uses in Section 5.4.1 of this chapter.

Comment 46-13: These standards and guidelines are currently in effect. They are not the preferred alternative, and will be replaced upon approval of these new standards and guidelines.

Comment 46-14: This assumption has not been made. For analytical purposes, a common denominator of AUM reductions was used. These were estimates only, for analytical purposes, and no decisions have been made that these would be the actual management measures taken to improve rangeland health.

Comment 46-15: See the general response to impacts from other programs and uses in Section 5.4.1 of this chapter.

Comment 46-16: This is addressed somewhat in the FEIS.

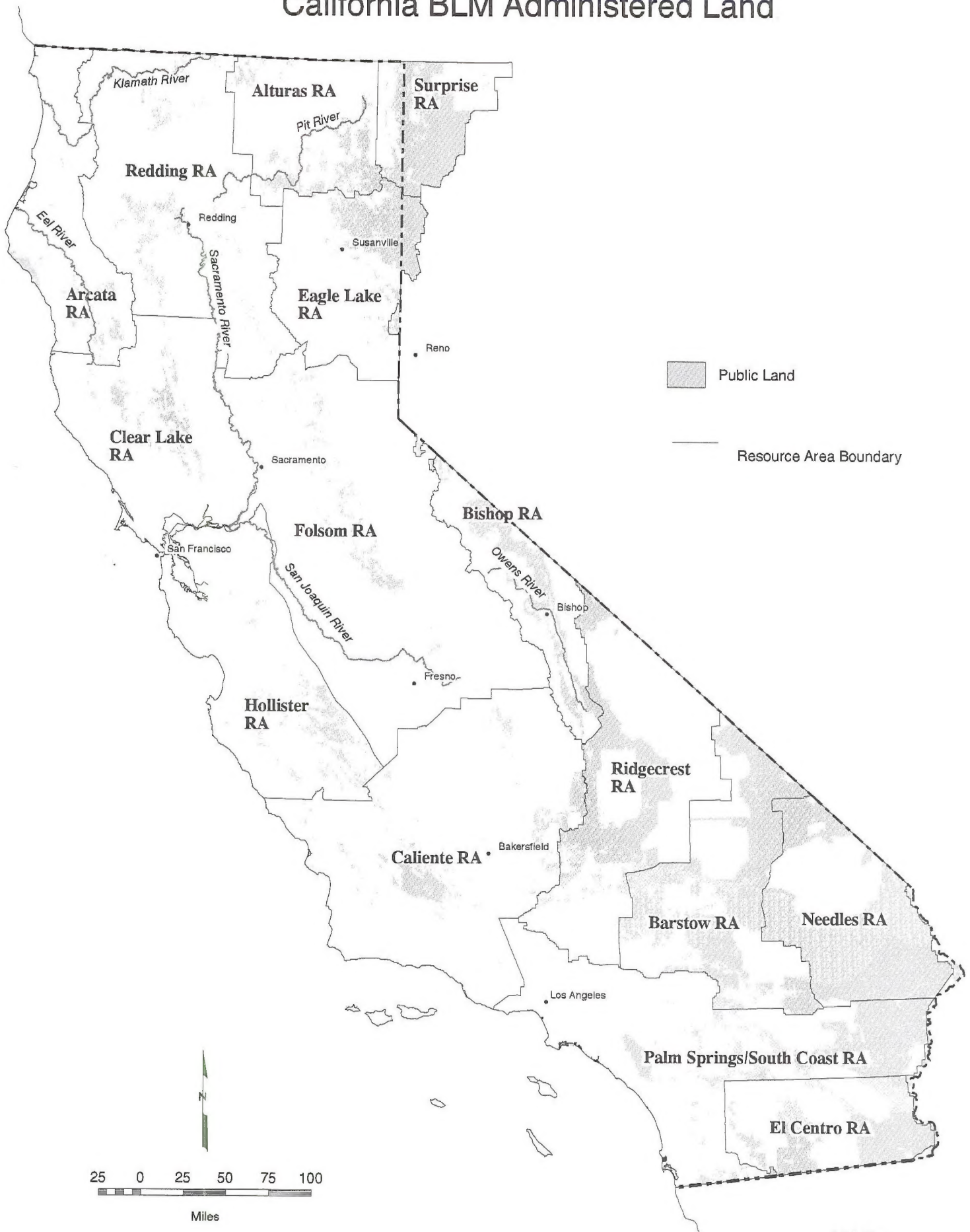
Comment Letter 47 -- Central Valley Regional Water Quality Control Board

Comment 47-1: Similar wording has been added to the water quality standards in the preferred alternative for all three RAC areas.

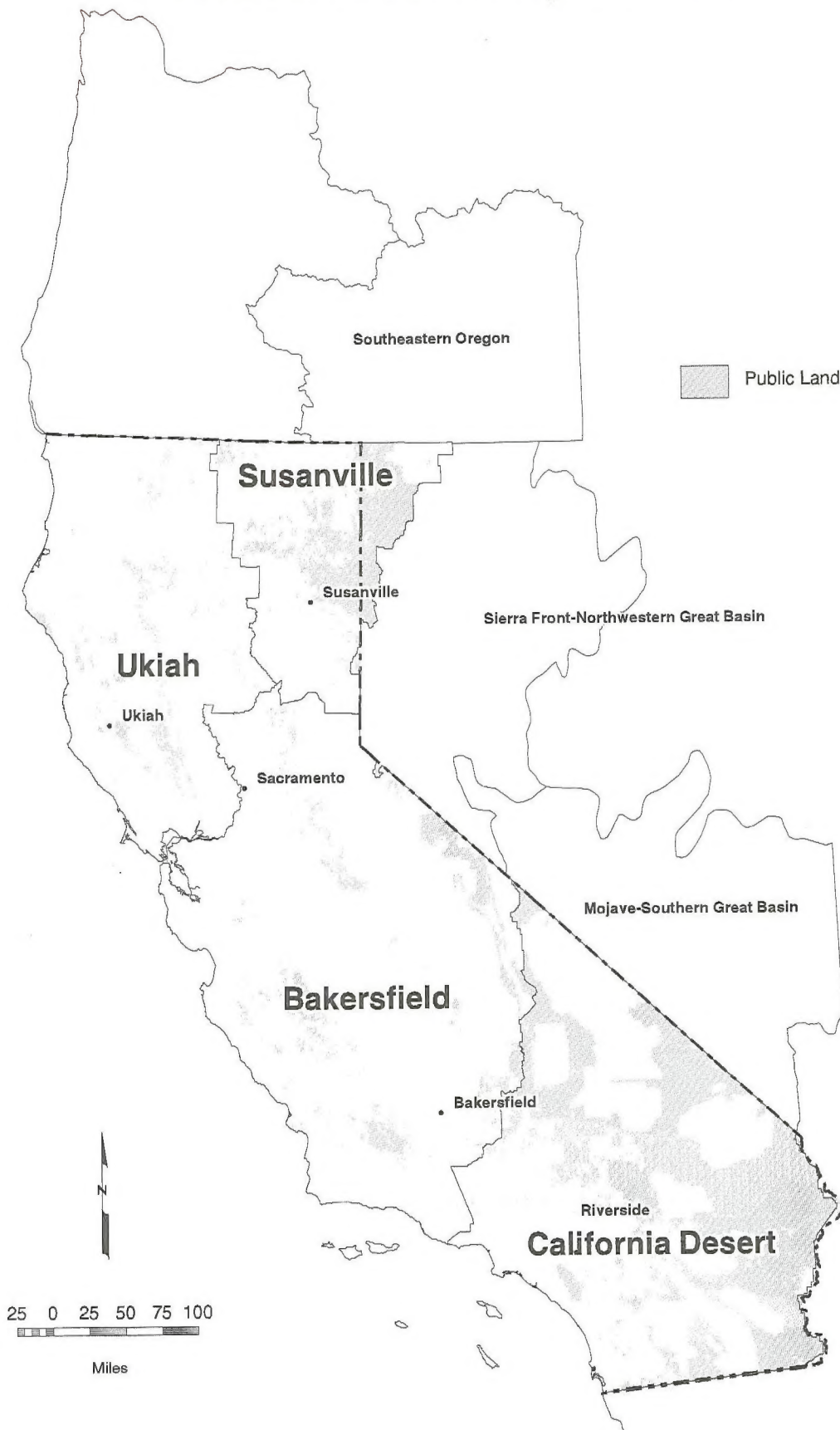
Comment 47-2: Comment noted.

Comment 47-3: Comment noted.

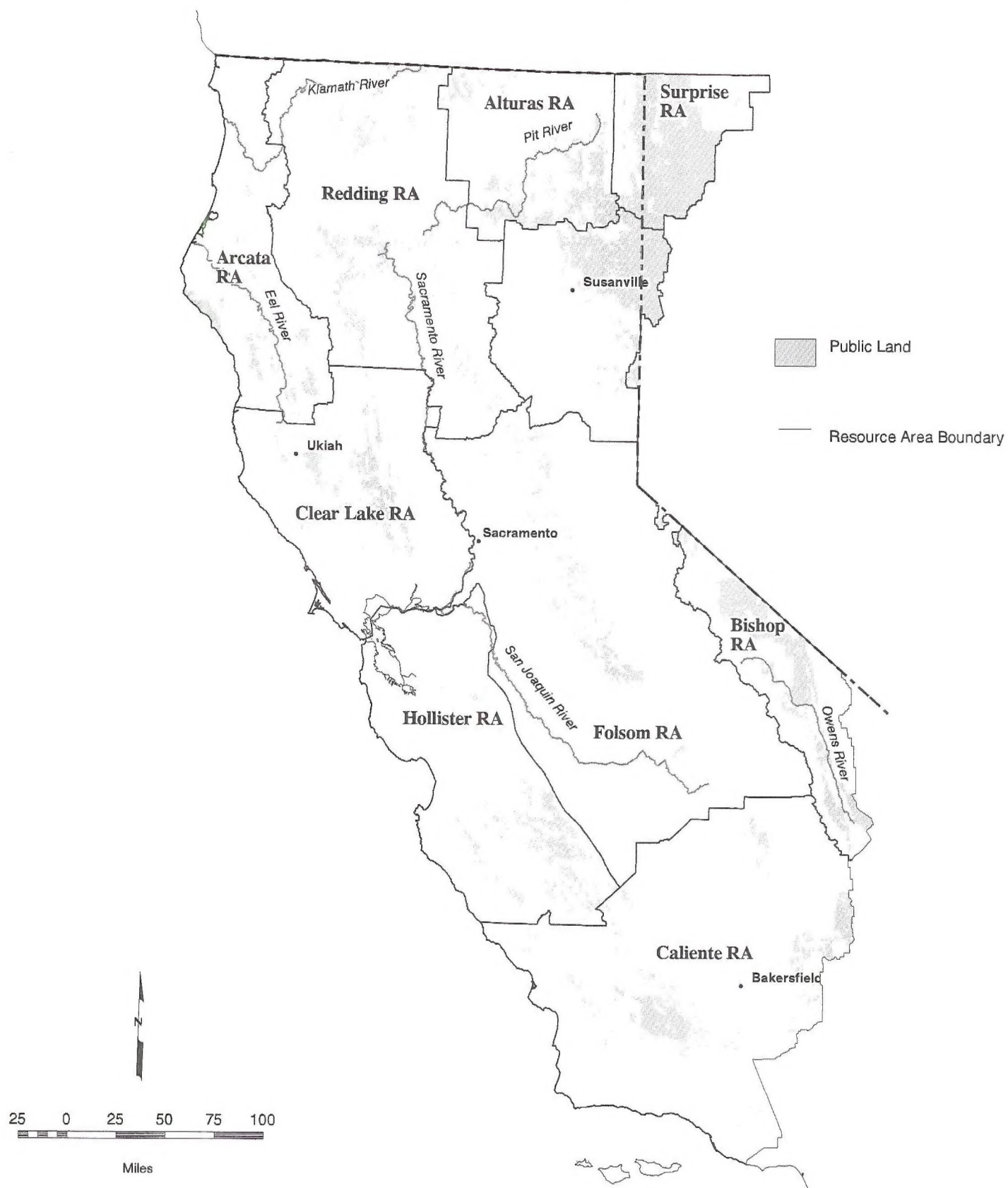
California BLM Administered Land



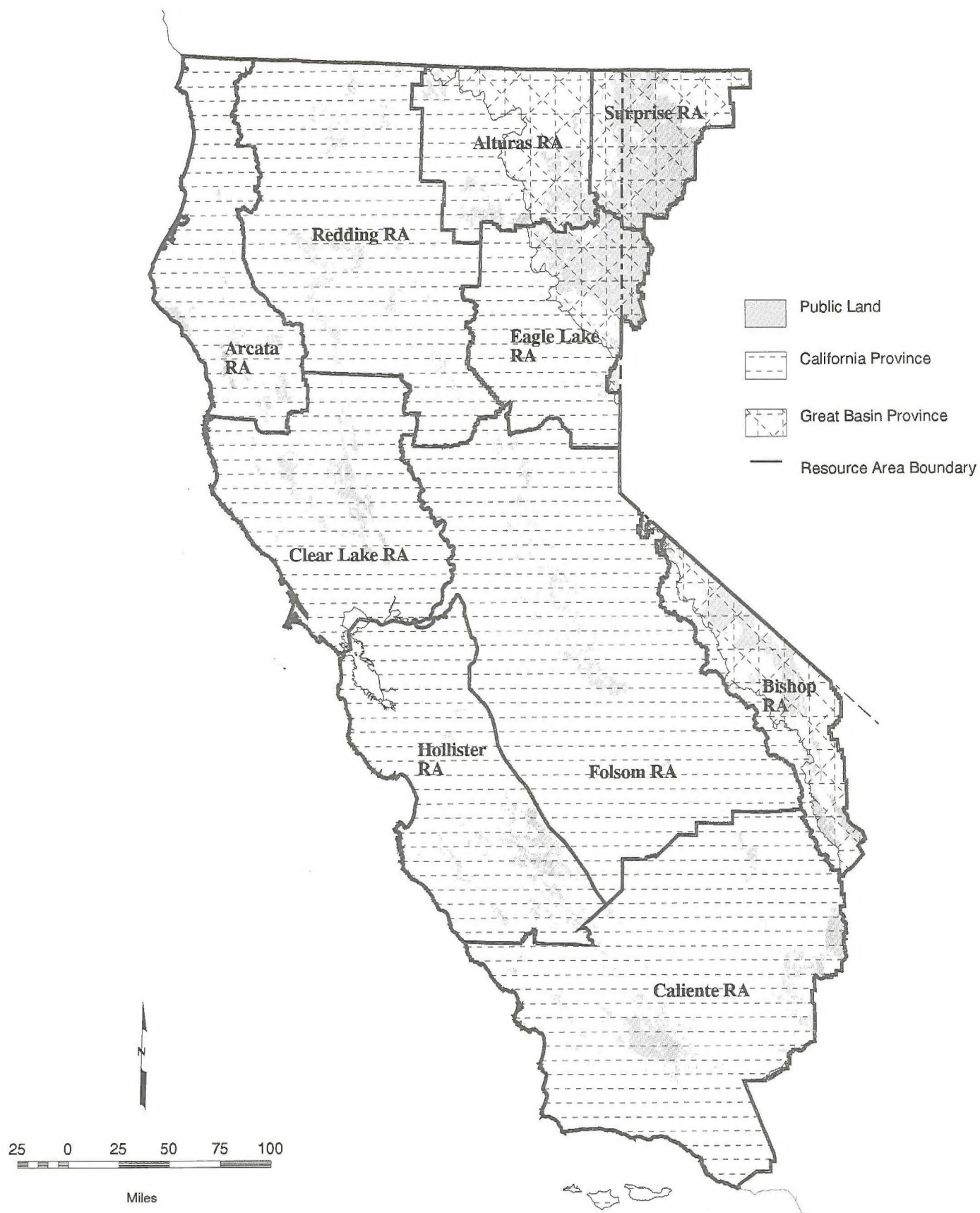
Resource Advisory Councils



Area of Analysis



Floristic Provinces



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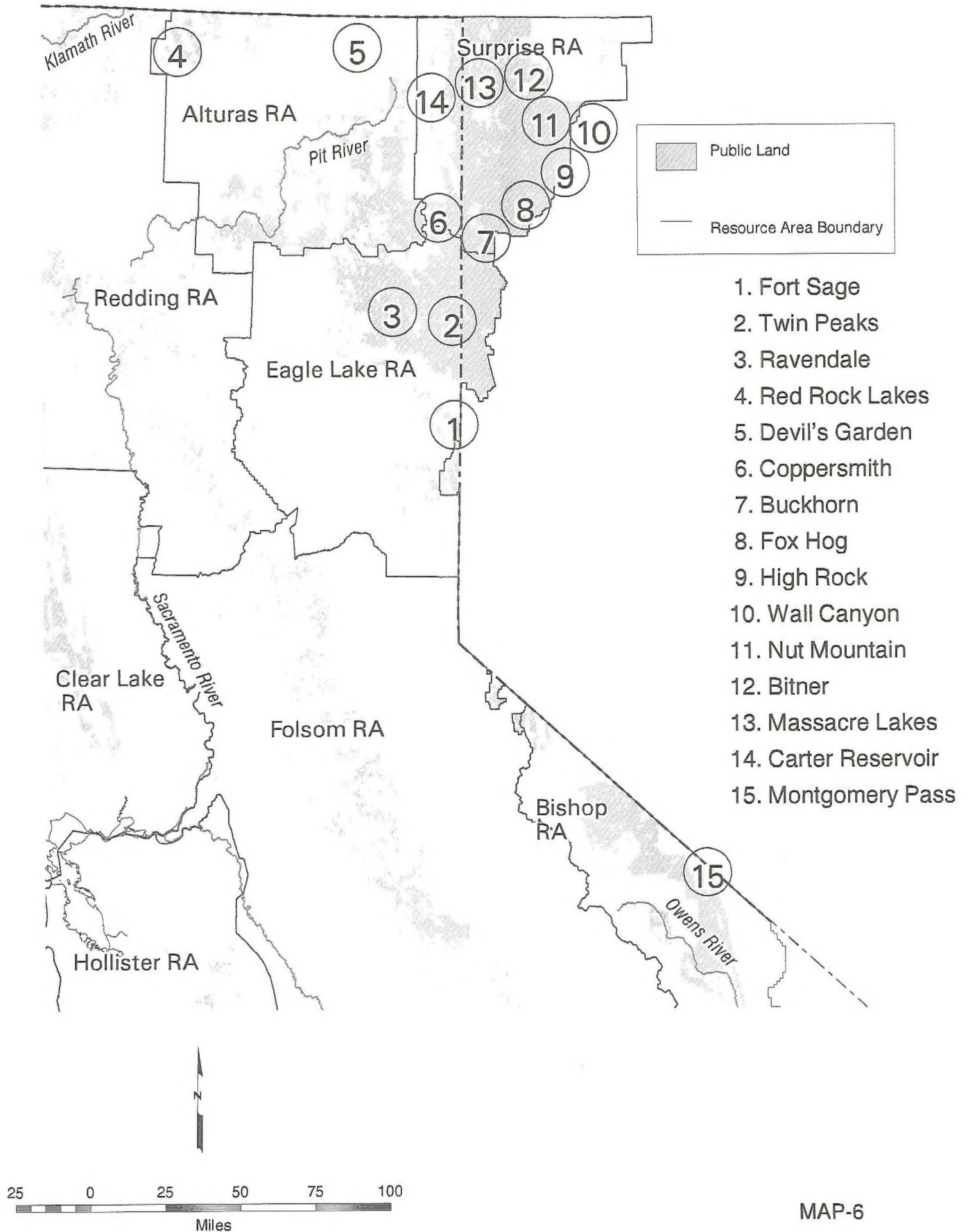
STATE OF CALIFORNIA
Pete Wilson, Governor

CALIFORNIA ENVIRONMENTAL
PROTECTION AGENCY
James M. Strock, Secretary

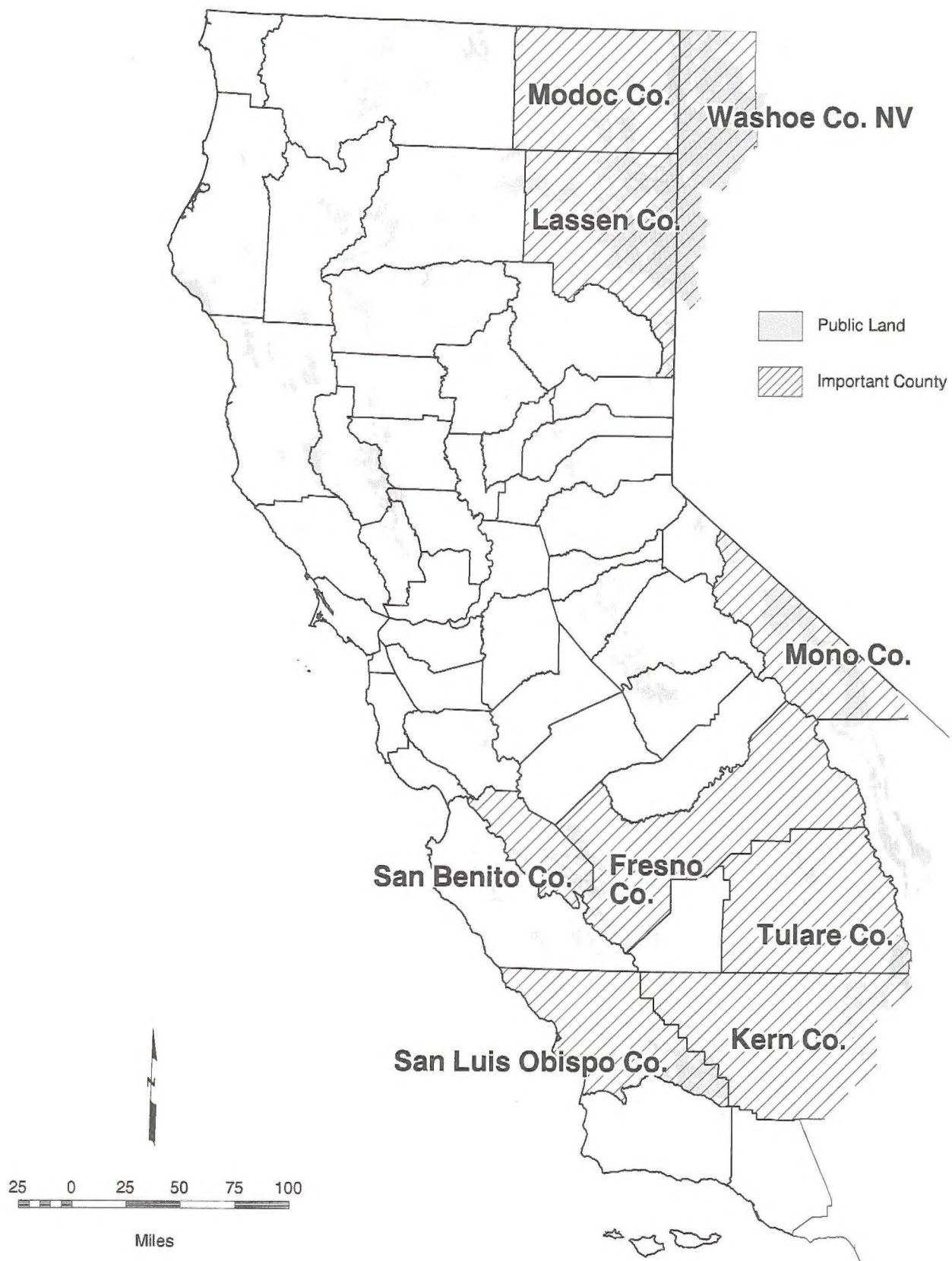
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MAP-5

Wild Horse and Burro Herd Management Areas



Important Range Counties for Economic Analysis



APPENDIX 1: RANGELAND HEALTH EVALUATION MATRIX

The Rangeland Health Evaluation Matrix was taken directly from pages 130 and 131 of the January 1994 report entitled Rangeland Health: New Methods to Classify, Inventory and Monitor Rangelands, published by the National Research Council. The matrix represents three phases of evaluation recommended by the committee. It is designed to be an evaluation tool that involves simple, often visual measurements.

Based upon limited field testing, there are a couple of important points to be remembered when using the matrix.

The first point is that soil stability and watershed function are the most important criteria when measuring rangeland health. These two factors should have greater weight than other criteria. Soil movement off site probably means that the rangeland is unhealthy.

The second point is that the precise boundary between the categories of healthy, at risk, and unhealthy is not clear. Placement of an area into one of these categories will require judgement, and there will be borderline cases that are difficult to place. There is good scientific understanding of how to use soil surface characteristics as indicators of soil stability. However, the scientific understanding needed to develop and interpret measurable indicators of changes in nutrient cycling, energy flow, and recovery mechanisms is less well developed (National Research Council 1994).

RANGELAND HEALTH EVALUATION MATRIX			
Indicator	Healthy	At Risk	Unhealthy
Soil Stability and Watershed Function			
Soil A horizon	Present and unfragmented	Present, but fragmented distribution developing	Absent, or present only in association with prominent plants or other obstructions
Pedestalling	None	Pedestals present, but on mature plants only. No roots exposed	Most plants and rocks pedestalled, roots exposed
Rills and gullies	Absent or with blunted or muted features	Small, embryonic, and not connected into a dendritic pattern	Well defined, actively expanding, dendritic pattern established
Scouring or sheet erosion	None visible	Patches of bare soil or scours developing	Bare areas and scours well developed and contiguous

Sedimentation or dunes	No visible soil deposition	Soil accumulating around plants or small obstructions	Soil accumulating in large barren deposits or dunes, or behind large obstructions
Distribution of Nutrient Cycling and Energy Flow			
Distribution of plants	Plants well distributed across site	Plant distribution becoming fragmented	Plants clumped, often in association with prominent individuals, large bare areas between clumps
Litter distribution and incorporation	Uniform across site	Becoming associated with prominent plants or other obstructions	Litter largely absent
Root distribution	Community structure results in rooting throughout available soil profile	Roots are absent from portions of the available soil profile	Roots only present in one portion of the available soil profile
Distribution of photosynthesis	Photosynthetic activity occurs throughout the period suitable for plant growth	Most photosynthetic activity occurs during one portion of plant growth period	Little or no photosynthetic activity on location during most of the period suitable for plant growth
Recovery Mechanisms			
Age-class distribution	Distribution reflects all species and age classes	Seedlings and young plants missing	Primarily old or deteriorating plants present
Plant vigor	Plants display normal growth form	Plants developing abnormal growth form	Most plants in abnormal growth form
Germination	Microsites suitable for germination present and well distributed	Developing crusts, soil movement or other factors degrading microsites; crusts are fragile	Soil movement or crusting sufficient to inhibit most germination and seedling establishment

Source: National Research Council, 1994.

APPENDIX 2: GRAZING EIS's in CALIFORNIA

California BLM Grazing Environmental Impact Statements		
EIS Title	Date	Resource Area
Tuledad / Home Camp	1979	Surprise -- south part
Cowhead / Massacre	1981	Surprise -- north part
Alturas	1984	Alturas ¹
Mount Dome	1981	Alturas -- NW part
CAL / NEVA	1982	Eagle Lake -- NE part
Willow Creek	1983	Eagle Lake -- NW part
Honey Lake / Beckworth	1984	Eagle Lake -- south part
Yokayo	1983	Clear Lake and Arcata
Redding	1983	Redding ²
Sierra	1983	Folsom
Hollister	1984	Hollister ³
South Sierra Foothills	1984	Caliente -- east part
Coast / Valley	1985	Caliente -- west part
Benton / Owens Valley	1982	Bishop -- south part
Bodie / Coleville	1983	Bishop -- north part
CDCA	1981	CDCA ⁴
East San Diego	1981	El Centro ⁵
Otay	1984	South Coast ⁶

¹ Includes most of Alturas Resource Area, and a small part of Surprise Resource Area.

² Also includes some grazing allotments in the Clear Lake and Alturas Resource Areas.

³ Also includes grazing allotments in Madera and eastern Fresno County in the Folsom Resource Area.

⁴ Includes all grazing areas in the California Desert Conservation Area, which includes the public rangelands administered by the Ridgecrest, Barstow, Needles and Palm Springs Resource Areas.

⁵ Includes the McCain Valley area in Eastern San Diego County.

⁶ Includes those areas available for grazing in San Diego County other than in the McCain Valley area.

APPENDIX 3: LEGAL FRAMEWORK

The Bureau of Land Management operates under a number of federal and state laws and regulations. The following is a brief listing of the major laws that affect BLM's management of public lands.

Some of these laws are specifically referenced within the EIS, some are not. Decisions within the EIS will not affect BLM's responsibility to adhere to and/or enforce these laws.

FEDERAL LAWS

National Environmental Policy Act (NEPA): NEPA requires all federal agencies to analyze the environmental impacts of any proposed action affecting public lands or resources, to involve the public in decision making, and to disclose environmental impacts to the public. NEPA also requires that the analysis be interdisciplinary and issue driven and that the cumulative and indirect effects be reported. An EIS is required for any major federal action significantly affecting the quality of the human environment.

Taylor Grazing Act (TGA): With amendments, this act is the basic legislative authority governing grazing use on the vacant public lands of the United States.

Federal Land Policy and Management Act (FLPMA): This law established public land policy providing for the retention and management of the public lands held in Federal ownership, including special provisions for land use planning and range management.

Public Rangelands Improvement Act (PRIA): This legislation of 1978 further supports the authority of the Taylor Grazing Act and the Federal Land Policy and Management Act by placing special emphasis for the improvement of rangeland conditions.

Wild Free-Roaming Horse and Burro Act: This act provides for the protection, management, and control of wild horses and burros on public lands administered by the BLM and the U.S. Forest Service. The basic goal is to keep the wild horse herds from disappearing, yet keep the herds at appropriate management levels to maintain a healthy functioning ecosystem. The act allows removal of animals if necessary to "restore a thriving natural ecological balance to the range, and protect the range from the deterioration associated with overpopulation."

Endangered Species Act (ESA): This act requires the federal land management agencies to protect and enhance all species and their habitats on federal lands that are listed as endangered, threatened, or proposed for listing. Included in this act in Section 7 is a required process for all federal agencies to consult with the U.S. Fish and Wildlife Service regarding any federal action that may affect a federally listed threatened or endangered species.

Clean Water Act (CWA): This law's objective, administered by the U.S. Environmental Protection Agency (EPA), is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. It directs the federal agencies to comply with water quality standards, including initiating actions to control non-point sources of pollution such as grazing, as determined by each respective State government and as approved by EPA.

Coastal Zone Act Re-authorization (CZARA): This act is applicable to all waters in California and, as amended in 1990, places additional requirements on the states to address non-point source pollution in several categories, including rangeland. The federal agencies, such as the Bureau of Land Management are to cooperate with the state in fulfilling these requirements.

Federal Noxious Weed Act: This 1974 act, as amended in 1990 (Section 15 of the act), adds further responsibility for the federal land management agencies, in cooperation with the respective state agencies, to actively pursue the control of undesirable plants using an integrated management approach.

Carson-Foley Act (43 USC 1241) of 1968: This law provides for the control of noxious plants on land under the control and jurisdiction of the Federal Government by permitting the appropriate state agency to enter such lands to destroy noxious plants.

Antiquities Act of 1906 and amendments: This act provides for the protection of historic and prehistoric sites and objects of antiquity on Federal lands; and authorizes scientific investigation of such sites and antiquities, subject to permits and other regulatory requirements. Paleontological resources are also covered by this act.

American Indian Religious Freedom Act: This 1978 act makes it a policy of the government to protect and preserve for Native Americans their inherent rights of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiian. These rights include, but are not limited to, use of sites and access to those sites, use and possession of sacred objects, and the freedom to worship through ceremony and traditional rites.

Executive Order 13007: This executive order affirms that Native Americans have the right to access specific spiritual and sacred sites on federal lands as long as that access is not inconsistent with the administrative goals of the agency.

Archeological Resources Protection Act: This act prohibits the removal, sale, receipt, and interstate transportation of archeological resources obtained illegally (without permits) from public or Indian lands and authorizes agency permit procedures for investigations of archeological resources on public lands under the agency's control. Amendments state that the Secretaries of the Interior, Agriculture and Defense shall develop plans for surveying the lands under their control to determine the nature and extent of archeological resources, prepare a schedule for surveying those lands that are likely to contain the most scientifically valuable archeological resources, and develop documents for reporting suspected violations. Tribes are given 30 days to comment on permits for the excavation of archeological resources within their "aboriginal territory."

National Historic Preservation Act of 1966 (NHPA): This act established historic preservation as a national policy and defines it as the protection, rehabilitation, restoration, and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. Significance is determined by specific criteria. The National Register of Historic Places is maintained by the National Park Service.

Native American Graves Protection Act of 1990 (NAGPRA): This act requires federal agencies and federally sponsored museums to establish procedures for identifying Native

American groups associated with cultural items on federal lands, to inventory human remains and associated funerary objects in federal possession, and to repatriate (return) such items upon request to affiliated groups. It also requires that any discovery of cultural items covered by the act shall be reported to the head of the federal agency, who shall notify the appropriate Native American tribe or community/organization.

Executive Order of April 29, 1994: This executive order established that it is the policy of the United States that formal government to government relationships shall be established between agency heads and all formally recognized tribes. This policy provides the impetus for developing protocols and memoranda of understanding between the BLM and the federally recognized tribes. BLM has also applied the policy to unrecognized Indian communities.

STATE LAWS (California and Nevada)

Porter-Cologne Water Quality Control Act: This act establishes a comprehensive water quality program for the state of California, through the State Water Resources Control Board, including a non-point source program on rangelands. This act also gives authority to nine semi-autonomous Regional Water Quality Control Boards within the state.

Nevada Revised Statutes (NRS) Chapter 445: This chapter authorizes the Nevada Department of Environmental Protection to serve as the designated agency in Nevada to implement the Clean Water Act and to develop comprehensive plans and programs for preventing, reducing, or eliminating pollution, including those from non-point sources on rangelands.

California Food and Agriculture Code, Section 403 and Title 3, California Code of Regulations, Section 4500: These codes provide the responsibilities and priorities governing the California Department of Food and Agriculture to protect the agricultural industry of the state by controlling weeds on all lands, including federally owned rangelands.

California Endangered Species Act: This act is administered by the California Department of Fish and Game and is patterned after the federal Endangered Species Act, by providing a state listing and protection responsibilities for species determined to be specifically protected within California.

California Native Plant Protection Act: This 1977 act provided for the California Department of Fish and Game to "preserve, protect, and enhance endangered plants in California".

APPENDIX 4: LAND USE PLANS in CALIFORNIA

In accordance with the range regulations at 43 CFR 4100, existing land use plans (Resource Management Plans, Management Framework Plans, and special plans such as PACFISH) have been examined to determine their compliance with the new regulations and the principles of rangeland health. In most cases, these plans do comply.

Except for the PACFISH and the Northern Spotted Owl planning decisions, existing plans will be amended to include the standards and guidelines that are adopted through this EIS. Where there are plan decisions that are contrary to the new regulations and the principles of rangeland health, those decisions will be removed from the plans. A complete list of the plans to be amended is in the following table.

LAND USE PLAN	PLAN DATE	FIELD OFFICE
Tuledad / Home Camp MFP	1978	Surprise -- south part
Cowhead / Massacre MFP	1980	Surprise -- north part
CAL / NEVA MFP	1982	Eagle Lake -- NE part
Willow Creek MFP	1983	Eagle Lake -- NW part
Honey Lake MFP	1983	Eagle Lake -- south part
Eagle Lake MFP Amendment	1990	Eagle Lake -- Eagle Lake area
Alturas RMP	1983	Alturas -- most of area
Ash Valley Amendment		Alturas -- part only
Mount Dome MFP	1981	Alturas -- part only
Redding (old) MFP	1983	Alturas -- part only
King Range Con. Area Mgt. Plan	1974	Arcata -- King Range only
Arcata RMP	1992	Arcata -- exclusive of King Range
Redding RMP	1993	Redding
Clear Lake MFP	1984	Clear Lake -- part
Sierra MFP Amendment	1988	Folsom
Hollister RMP	1984	Hollister
Clear Creek Amendment	1995	Hollister -- part only
Bishop RMP	1993	Bishop
Caliente RMP	1997	Caliente

A discussion of the plan maintenance process is contained in the Implementation Plan in Appendix 21.

APPENDIX 5: ALLOTMENT PRIORITY CATEGORIZATION

Since the early 1980's grazing allotments have been assigned to one of three categories, based upon current resource conditions and the potential for improvement. This categorization has served as a method for the BLM to determine which allotments should have the most management attention. Each allotment is to be reviewed at least annually to determine if the categorization is still appropriate for the particular allotment based on monitoring or other information. If not, the Area Manager is to reassign the allotment to the appropriate category. The following table shows the number of allotments in each Resource Area, and their current category. The categories are described following the table.

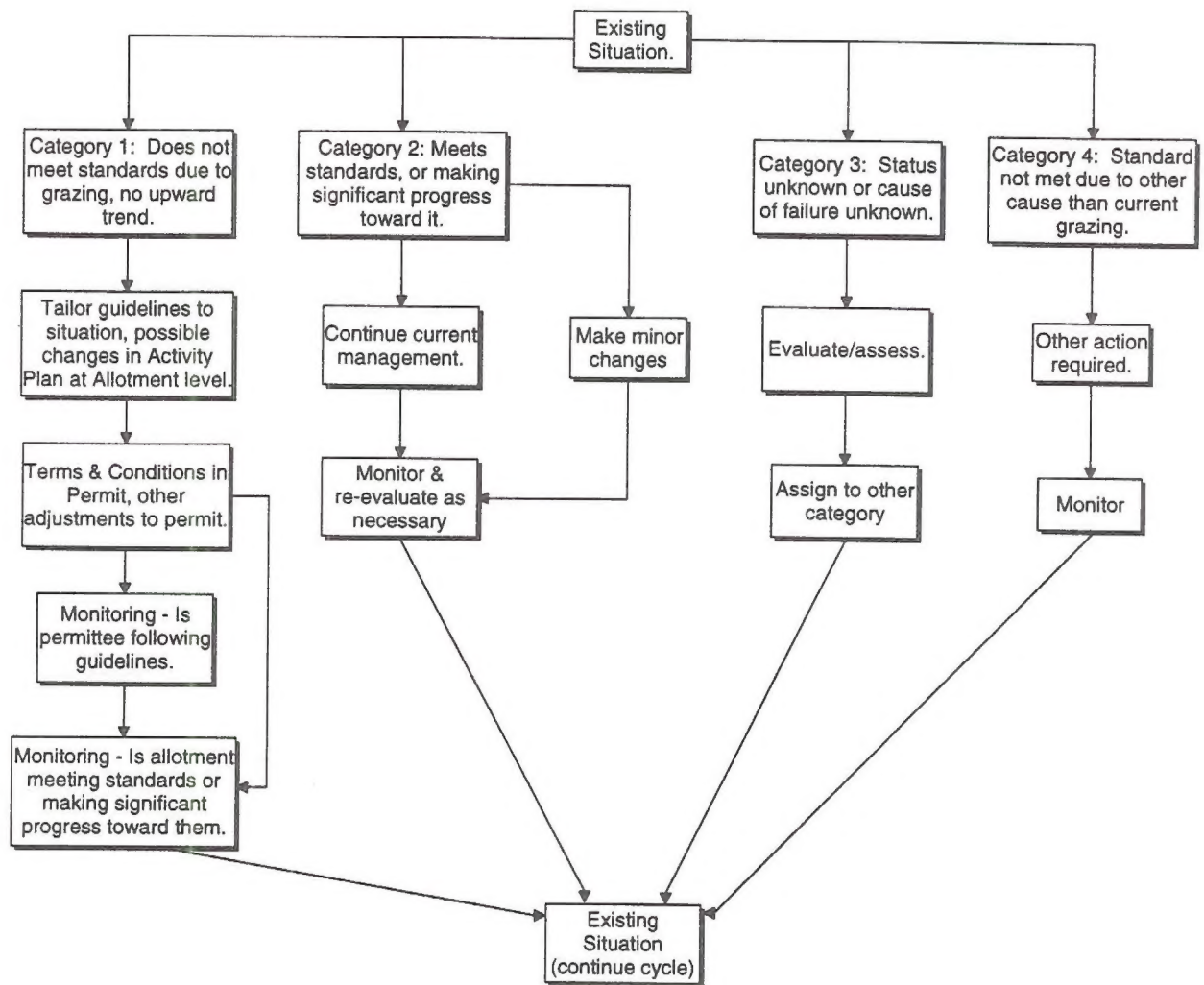
Resource Area	Management Priority Categories			Total Allotments
	I	M	C	
Redding	3	12	23	38
Clear Lake	3	2	10	15
Arcata	5	2	4	11
Eagle Lake	21	13	23	57
Surprise	26	4	22	52
Alturas	22	24	111	157
Bishop	12	18	30	60
Folsom	8	6	51	65
Caliente	82	12	19	113
Hollister	31	24	26	81
TOTAL	213	117	319	649

(1) Category "I" (Improvement) allotments generally have potential for increasing resource production or conditions, but are not producing at that potential. There may be conflicts or controversy involving resource conditions and uses, but there are realistic opportunities to enhance resource conditions.

(2) Category "M" (Maintain) allotments are in satisfactory resource condition and are producing near their potential under existing management strategies. There are little or no known resource use conflicts or controversies.

(3) Category "C" (Custodial) allotments usually consist of relatively small acreage or parcels of public land. They are often, but not always, intermingled with larger amounts of non-federally owned lands. There should be no known resource conflicts involving use or resource conditions. Usually opportunities for positive economic return from public investments are limited in these allotments.

APPENDIX 6: IMPLEMENTATION FLOW CHART



APPENDIX 7: CONDITION and TREND

Tables 1 through 6 show rangeland conditions and trends as of September 30, 1996.

Please remember, when we talk about trend and condition as it has been used by BLM, NCRS and others, we are not talking about rangeland health or proper functioning condition (which is what we need to discuss). What we are talking about is whether a site is moving towards a climax vegetative community, which may not be the desired state. In many cases, we are managing for, and desire, a lower seral stage, or a mix of stages spread over the landscape. Although we may say that the condition is poor, with no upward trend, this does not necessarily mean that these areas are in poor health.

Table 1 -- Range condition of uplands in the sagebrush steppe vegetation type, as determined by: a. ecological site inventory; or b. other inventory methods and professional judgement.

a. Ecological site inventory.

Resource Area	Total BLM Acres Inventoried	Ecological Status (Acres)				
		Potential Natural Community	Late Seral	Mid Seral	Early Seral	Unclassified
Bishop	227,068	37,781	105,817	71,870	11,600	0
Eagle Lake	946,397	1,275	99,246	432,189	370,198	43,489
Surprise	101,486	1,341	54,251	33,518	3,880	8,496
Redding	13,558	0	0	5,551	3,223	4,784
Totals	1,288,509	40,397	259,314	543,128	388,901	56,769

b. Other inventories and professional judgement.

Resource Area	Total BLM Acres Assessed	Range Condition (Acres)				
		Excellent	Good	Fair	Poor	Unclassified
Bishop	375,941	96,906	90,914	144,625	43,496	375,941
Eagle Lake	49,350	640	3,523	11,384	19,014	14,789
Surprise	1,343,999	0	88,474	862,443	393,082	0
Alturas	496,773	10,090	94,653	192,125	40,607	159,298
Caliente	120,927	32,953	41,184	37,079	0	9,711
Totals	2,386,990	140,589	318,748	1,247,656	496,199	183,798

Table 2 -- Forage condition of non-native grass seedings in the sagebrush steppe vegetation type.

Resource Area	Total BLM Acres Assessed	Forage Condition (Acres)				
		Excellent	Good	Fair	Poor	Unclassified
Bishop	11,021	8,197	1,364	800	660	0
Eagle Lake	9,730	0	9,730	0	0	0
Surprise	34,261	0	31,458	2,803	0	0
Alturas	4,460	300	2,320	1,840	0	0
Caliente	7,217	2,617	3,300	700	600	0
Totals	66,689	2,917	45,854	6,143	1,260	0

Table 3 -- Range condition of uplands in the annual grassland vegetation type, based on a combination of inventories (other than ecological site inventory) and professional judgement.

Resource Area	Total BLM Acres Assessed	Range Condition (Acres)				
		Excellent	Good	Fair	Poor	Unclassified
Arcata	35,431	13,395	10,062	11,974	0	0
Clear Lake	19,076	0	0	0	0	19,076
Redding	35,712	90	22,022	4,662	0	8,938
Caliente	337,372	5,716	250,832	41,557	4,193	35,074
Folsom	87,879	0	87,879	0	0	0
Hollister	149,211	0	149,211	0	0	0
Totals	664,681	19,201	520,006	58,193	4,193	63,088

Table 4 -- Forage condition of non-native seedings in the annual grassland vegetation type.

Resource Area	Total BLM Acres Assessed	Forage Condition (Acres)				
		Excellent	Good	Fair	Poor	Unclassified
Clear Lake	100	100	0	0	0	0

Table 5 -- Trend of rangelands in the sagebrush steppe vegetation type.

Resource Area	Total BLM Acres Assessed	Trend			
		Up	Static	Down	Undetermined
Bishop	614,030	160,257	298,247	155,526	0
Eagle Lake	1,005,477	0	0	0	1,005,477
Surprise	1,479,746	625,797	707,187	146,762	0
Alturas	501,233	6,611	400,052	33,997	60,573
Caliente	128,144	20,326	53,811	37,079	16,928
Redding	13,558	1,604	4,538	7,170	246
Totals	3,742,188	814,595	1,463,835	380,534	1,083,224

Table 6 -- Trend of rangelands in the annual grassland type.

Resource Area	Total BLM Acres Assessed	Trend			
		Up	Static	Down	Undetermined
Arcata	35,431	850	29,715	0	4,866
Clear Lake	19,176	0	3,680	0	15,496
Redding	35,712	13,173	15,202	0	7,337
Caliente	337,372	143,655	138,345	27,515	27,857
Folsom	87,879	6,077	81,802	0	0
Hollister	149,211	0	149,211	0	0
Totals	664,781	163,755	417,955	27,515	55,556

APPENDIX 8: BEST MANAGEMENT PRACTICES for WATER QUALITY -- CALIFORNIA

The following is a listing of water quality best management practices for grazing on privately-owned rangelands in California. It is taken from Appendix C of the California Rangeland Water Quality Management Plan adopted by the State Water Resources Control Board in July 1995.

APPENDIX C: DETAIL ON MANAGEMENT PRACTICES

Best Management Practice, Management Measures, and Management Practices

The term "best" is subject to interpretation and point of view. In recognition of this, the Coastal Zone Act Re-authorization Amendment uses the new terms "management measures" and "management practices":

Best Management Practice (BMP) "is a practice or combination of practices that is determined by a state to be the most effective means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals" (Federal Clean Water Act, 1977).

Management measures are goals for management of non-point source pollution for a state basin, watershed, or ranch. They describe what we want to happen in the long-term and they should be linked to impaired beneficial uses of water. An example of a ranch management measure might be to "increase streambank vegetation along the portion of Deer Creek that runs through the ranch." Under voluntary compliance these goals or management measures are determined by the rancher. If voluntary compliance is unsuccessful, the regional Water Quality Control Board (RWQCB) may require specific management measures and/or practices.

Management Practices applied alone or in combination address the goals stated as management measures.

Developing Management Practices

Ranchers: Many of the range management practices currently used by ranchers and range managers will become water quality management practices. Water quality management practices should be planned and applied just like any other business decision on a ranch. Management practices must be technically and economically feasible.

Professionals: Management practices can be designed by range management professionals using the most technically sound research and management information available. For that reason, as technology, environmental or financial conditions change, management practices should be updated to reflect those changes.

Regional Water Quality Control Boards: EPA delegates water quality regulations including management measures and practices to the State Water Resource Control Board (SWRCB). Legally, a practice must be certified by the SWRCB. The SWRCB may delegate this authority

to the Regional Water Quality Control Boards (RWQCB). They may accept the practices in the SCS Field Office Technical Guides or they may require management practices unique to the situation under Tier Three enforcement. Prior to Tier Three, the Porter-Cologne Water Quality Control Act prohibits the RWQCB from requiring specific practices; they may only require that standards be met.

Field Office Technical Guides: The Natural Resource Conservation Service (NRCS, formerly SCS) has conducted a program of voluntary soil and water conservation planning with private landowners and resource managers for over 50 years. The NRCS relies upon a Technical Guide, localized to the geographic area of a Field Office, and a National Planning Manual as guides for technical assistance. The Field Office Technical Guides may be revised as needs and techniques change.

Implementation of Management Practices

The rancher may seek technical assistance from UC Cooperative Extension, USDA Natural Resource Conservation Service, Resource Conservation Districts or other agencies to help identify water quality problems, develop management statements of water quality goals or objectives and select management practices. The amount or extent to which a practice is applied must be consistent with national, state and basin water quality goals and should reflect the relative contribution of that type of land use activity toward water quality problems within the basin. This technical assistance will result in a plan, typically known as ranch plan or conservation plan. Because writing a ranch plan is the landowner's first tangible step in voluntarily reducing non-point pollution sources, ranch planning is listed as the first management practice in the next section.

Management Practices for California Rangelands

Following are example management practices suitable for California's privately owned rangelands. Additional practices, which may apply to water quality protection but are not listed here are found in the NRCS Field Office Technical Guide and may be of use to and individual situation. The number in parentheses refers to the practice number in the NRCS Field Office Technical Guide.

1. RANCH PLAN: The goal of maintaining or improving the quality of water should be included in ranch management plans for livestock operations. Ranch water quality goals need to be linked to water quality problems (impaired beneficial uses) identified by the Regional Water Quality Control Boards for the local basin or sub-basin. Ranch plans may follow several formats.

- * Natural Resources Conservation Service Conservation Planning
- * UCCE Ranch Planning Short Course Outline
- * Holistic Resource Management
- * Any organized planning process conducted by the landowners, agencies or private consultants

Appendix B outlines the contents of ranch plans that address water quality as well as other aspects of the ranch operation.

2. GRAZING MANAGEMENT PRACTICES: Prescribed grazing may be achieved by controlling season, intensity, frequency and distribution of grazing.

2.1 Prescribed Grazing (528A) The controlled harvest of vegetation with grazing or browsing animals managed with the intent to achieve a specified objective, such as:

- * Improve or maintain the health and vigor of selected plants and to maintain a stable and desired plant community
- * Provide or maintain food, cover and shelter for animals of concern
- * Improve or maintain animal health and productivity
- * Maintain or improve water quality and quantity
- * Reduce accelerated soil erosion and maintain or improve soil condition

2.2 Use Exclusion (472) Use exclusion of animals, people or vehicles from an area to protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water and aesthetic resources and human health (and) safety.

3. STRUCTURAL RANGE IMPROVEMENTS: Structural range improvements may be used to facilitate proper grazing use. These practices should be planned, constructed, and utilized in a manner to enhance or maintain water quality. These practices should be linked in the ranch plan to proper grazing use, and other ranch water quality goals.

3.1 Access Roads (560) Roads constructed to provide access to farms, ranches and fields. used for moving livestock, produce, equipment and supplies and to provide access for management of ranch resources.

3.2 Fencing (382) Enclosing or dividing an area of land with a suitable permanent structure that acts as a barrier to livestock, big game, or people (does not include temporary fences). Fencing may protect riparian areas which act as sediment traps and filters along water channels and impoundments.

3.3 Grade Stabilization (410) A structure used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation and advance of gullies, and to enhance environmental quality and reduce pollution hazards.

3.4 Pipelines (516) Pipeline installed for conveying water for livestock or for recreation. Pipelines may decrease sediment, nutrient, organic, and bacteria pollution from livestock by providing water sources other than streams and lakes.

3.5 Ponds (378) A water impoundment made by constructing a dam or an embankment or by excavation of a pit or dugout. Ponds may provide alternate water sources away from (a)

stream. Ponds are often used in conjunction with pipelines and troughs and tanks. Ponds may trap nutrients and sediment which wash into the basin.

3.6 Sediment Basins (350) A basin constructed to collect and store debris or sediment. Sediment basins will remove sediment and associated materials and other debris from the water which is passed downstream. Stockwater ponds often act as sediment basins.

3.7 Spring Development (574) Improving springs and seeps by excavating, cleaning, capping, or providing collection and storage facilities. There will be negligible long-term water quality impacts with spring developments. Erosion and sedimentation may occur from any disturbed areas during and immediately after construction, but should be short-lived. The stream source will usually be fenced.

3.8 Stock Trails or Walkways (575) A livestock trail or walkway constructed to improve grazing distribution and access to forage and water. This practice may be used to reduce livestock concentration, facilitate proper grazing use and (implement) planned grazing systems.

3.9 Streambank Protection (580) Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.

3.10 Troughs and Tanks (614) Installation of a trough or tank may facilitate improved distribution of livestock. Troughs and tanks are often an effective means of providing stock water away from streams.

3.11 Landslide Treatments (453) Treatments to prevent or stabilize landslides to protect life and property and to prevent excessive erosion and sedimentation.

3.12 Well (642) A well may be constructed or improved to provide stockwater away from streams and other critical areas. As a new water source it will improve livestock distribution.

3.13 Stream Crossing (Interim) A stabilized area to provide access across a stream for livestock and farm machinery. The purpose is to provide a controlled crossing or watering access point for livestock along with access for farm equipment.

4. LAND TREATMENTS: Land treatments to manage vegetation, practices to reduce erosion or improve wildlife habitat should be planned, implemented and maintained to minimize adverse impacts on water quality.

4.1 Brush Management (314) Managing and manipulating stands of brush (and weeds) on forest, range, pasture land by mechanical, chemical, or biological means or by prescribed burning. The purpose of brush management is to increase ground cover, reduce fire hazard, improve water quality in the long term, improve forage production and quality, increase runoff and other objectives depending on landowner goals. Brush management may temporarily impair water quality by increasing sediment yields because of soil disturbances and reduced vegetative cover.

4.2 Prescribed Burning (338) Applying fire to predetermined areas under conditions for which the intensity and spread of the fire are controlled. Prescribed burning is a brush management practice.

4.3 Critical Area Planting (342) Planting vegetation, such as trees, shrubs, vines, grasses, or legumes, on highly erodible or critically eroding areas. (Does not include tree planting mainly for wood products.) This practice may reduce soil erosion and sediment delivery to surface waters. During grading, seedbed preparation, seeding, and mulching, sediment may impair surface water quality prior to plant establishment.

4.4 Range Seeding (550) Establishing adapted plants by seeding on native grazing land. (Range does not include pasture and hayland planting.) Increased erosion and sediment yield may occur during the establishment of this practice. This is a temporary situation which diminishes when the reseeded area becomes established.

4.5 Grazing Mechanical Treatments (548) Renovating, contour furrowing, pitting or chiseling native grazing land by mechanical means to improve plant cover and water quality by aerating the soil, increasing infiltration and available moisture, reducing erosion and protecting low lying land or structures from siltation.

4.6 Stream Corridor Improvement (204) Restoration of a modified or damaged stream to a more natural state using bioengineering techniques to protect the banks, and to re-establish the riparian vegetation. It does not apply to short reaches of stream that should be treated by Practice 580 (Streambank Protection) or Practice 584 (Stream Channel Stabilization).

4.7 Wildlife Wetland Habitat Management (644) or Woodland Development or Restoration Retaining, creating or managing woodland habitat for wildlife. The construction or restoration of a woodland facility to provide the hydrologic and biologic benefits of a wetland.

4.8 Wildlife -- Upland Habitat Management (645) Creating, maintaining or enhancing areas for food and cover for upland wildlife.

5. LIVESTOCK MANAGEMENT PRACTICES: Livestock management practices such (as) animal health, feeding and salting should be done in a manner to protect water quality.

5.1 Livestock Parasite Control () Livestock health and other management practices used to reduce parasites and pathogens.

5.2 Supplemental Feeding and Salting () Feeding practices that minimize livestock concentration near water bodies and facilitate more uniform livestock distribution.

6. FACILITY SITING/DESIGN CRITERIA: Not included as an NRCS practice, but involves the consideration of the location and/or design of feeding, working, holding, chemical storage and shipping facilities in proper proximity for water quality protection.

APPENDIX 9: BEST MANAGEMENT PRACTICES for WATER QUALITY -- NEVADA

The following is a listing of water quality best management practices for grazing on rangelands in Nevada from Chapter 7 of their grazing management plan. They were adopted by the State of Nevada on December 7, 1994.

LIVESTOCK

BMP 7-8 PLANNED GRAZING SYSTEM

DEFINITION

A livestock/wildlife grazing system in which two or more grazing units are alternately deferred or rested from grazing in a planned sequence over a period of years. The rest period may vary in duration given the specifics of the grazing area (ie. season, year, etc.).

PURPOSE

1. To maintain or improve plant cover, plant composition and forage production while properly using the forage on all grazing units
2. To improve efficiency of grazing by uniform use of all parts of each grazing unit.
3. To provide a supply of forage throughout the grazing season.
4. To improve the quality of forage available to animals during specific seasons.
5. To protect watershed, reduce runoff and sedimentation for the improvement of surface and ground water quality.
6. To improve wildlife habitat.

APPLICABILITY

Applies to native grazing lands, including those treated by spraying, seeding, etc., grazable woodlands and grazed wildlife lands. Grazing management may be applied to a single grazing unit and may be adequate to meet water quality objectives where proper grazing use and uniform distribution can be obtained.

PLANNING CRITERIA

The grazing system plan should:

1. Consider the climate, soils, range sites, present vegetative conditions, topography and other ecological conditions.
2. Allow forage use allocation for livestock and wildlife.

3. Be coordinated among all effected interest and natural resources. A "watershed" view should be established to identify all of the resources and interests. The coordinated approach should include federal land management agencies, state agencies, private land owners, other grazing users and applicable special interest groups. A variety of Resource Management and/or grazing systems are available given the specifics of the site including Holistic Resource Management, Coordinated Resource Management, and Savory Grazing Systems, to mention a few.
4. Consider specific management measures to alleviate livestock distribution problems such as concentrated use of riparian areas or other critical areas.
5. Should consider the kinds of livestock and the operator's objectives in conjunction with the federal land management objectives if the plan involves public lands.
6. Allow for practical application of the system and be flexible enough to meet the needs of key plant species and communities in relation to climatic fluctuations.
7. Consider the facilities needed for proper distribution and uniform use of grazing units such as fences, stock water developments, stock trails, access roads, salt, and supplemental feeding stations.
8. Provide for prolonged drought or other unusual circumstances. A monitoring plan should be included which monitors plant species use and condition with respect to the desired condition.
9. Consider economic costs in relation to the benefits expected from the entire system.

METHODS AND MATERIALS

1. **Grazing Management Systems** - Appropriate grazing management systems ensure proper grazing use by adjusting grazing intensity and duration to reflect the availability of forage and feed designated for livestock uses, and by controlling animal movement through the operating unit of range or pasture. Practices that accomplish this include:
 - A. Deferred grazing** - usually is defined as the postponing or resting of livestock grazing on an area for a prescribed period to provide for plant reproduction, establishment of new plants, or restoration of vigor to existing plants.
 - B. Deferred-rotation grazing** - Provides for a systematic rotation of deferment among two or more units.
 - C. Rest-rotation grazing** - Provides for adequate rest to restore and maintain plant vigor, reduced trampling of mature seeds after plant maturity, and establishment of seedlings. Grazing and rest are systematically rotated until all pastures within the system have received treatment. Rest periods may be throughout the year, during the growing season of key plant species or may include one full year of rest.
2. **Livestock Distribution** - Proper distribution of livestock is needed for the efficient and uniform use of each grazing unit. A livestock operator can implement the

management practice of herding or moving livestock when the desired plant use has been attained in a given area:

A. Fencing - Fences are usually required for livestock control and to divide ranges into grazing units of near equal capacity. Fences are also needed to exclude livestock from sensitive or critical areas. (See Appendix G-5 for fencing guidelines and specifications)

B. Stockwater Developments - It is essential to provide adequate water for livestock within reasonable distance of the grazing areas. Implementation of an improved grazing system often concentrates livestock requiring development of new or higher capacity watering facilities. In some applications water alone can be controlled to move livestock from one area to another.

There are several methods of developing stock water, including:

- (1) Spring developments - Improving springs and seeps by excavating, cleaning, capping or providing collection and storage facilities
- (2) Wells - Constructed or improved to meet the needs of livestock and wildlife.
- (3) Stockwater ponds and dugouts - A water impoundment made by constructing a dam or an embankment, or by excavation of a pit or dugout.
- (4) Pipelines, trough or tank - Pipeline to convey water to areas with no water source and a trough or tank for storage.
- (5) Photovoltaic pumping systems.
- (6) Ram pumps.
- (7) Windmills.

C. Stock Trails - May be needed where natural or man-made barriers limit access and movement of grazing animals. (See Appendix G-4 for guidelines and specifications for stock trails).

D. Salt, Mineral and Feed Supplement Locations - These need to be properly placed for good distribution of grazing animals throughout each grazing unit. They may be placed in light use areas away from water.

3. **Access** - It is necessary to have good access to all grazing areas for livestock management and to service and maintain facilities. Refer to NRS 535.010 on permit requirements for stock watering ponds and dams.

MAINTENANCE

Proper grazing will maintain enough live vegetation and litter cover to protect the soil from erosion; will achieve riparian and other resource objectives; and will maintain or improve the quality, quantity and age distribution of desirable vegetation. Maintain fences and other facilities for efficient operations. Follow proper grazing use, that is, grazing at an intensity that will maintain plant cover and maintain or improve the quantity and quality of desirable vegetation. Adjust system plans based on inspection and records of utilization.

EFFECTIVENESS

A properly operated grazing system provides for efficient use of forage and is an effective means of maintaining a plant cover that will reduce runoff and sediment delivery. How effective grazing management will be is dependent upon both the quality of the design in relation to the land and the skill utilized to implement, monitor and adjust management to meet objectives.

BMP 7-9 PROPER GRAZING USE

DEFINITION

Utilizing grazing practices at an intensity which will maintain enough cover to protect the soil and maintain or improve the quantity and quality of desirable vegetation.

PURPOSE

To improve or maintain the condition of plant species or community; to improve vegetative ground cover, and to maintain or improve the quality of surface runoff water on upland areas. In riparian areas, the purpose is to provide minimum vegetation stubble height to slow runoff, trap sediment, and ensure adequate root mass to hold banks during spring run off events.

APPLICABILITY

On all rangeland, woodland, pasture land, wetlands, riparian areas, and cropland utilized for livestock or wildlife grazing.

PLANNING CRITERIA

Specific grazing or allotment plans should consider the following:

1. Grazing frequency;
2. Stocking rates and distribution;
3. Class and age of livestock, wildlife or free roaming horses or burros;

4. Season of forage use and the duration of each rest and grazing period;
5. Historic and/or prior livestock distribution problems including areas with concentrated use or overuse and areas where forage has remained unused;
6. Manger preferences for plant species, the abundance of those species and the forage use allocation for livestock, wildlife or free roaming horses and burros;
7. The grazing system being used;
8. Physical terrain limitations; access and water sources;
9. Desired vegetation in riparian and/or critical areas is of significant importance to wildlife, fisheries and watershed function; and,
10. Other public land users.

The importance of climate and weather patterns must also be recognized with a certain flexibility provided for extreme variations in amounts of forage from year to year.

The best measure of proper use and management is the response of the range over a period of time to a comprehensive management system. An experienced range manager can recognize the signs of response and the range trend. Management decisions should then be based upon sound scientific data and analysis.

METHODS AND MATERIALS

Consult with a qualified range management professional in either the private or public sector before establishing a grazing management system. The following are key elements for proper grazing use.

1. Use a comprehensive data form that provides a use record of key forage species each year or grazing season.
2. Keep a record for each grazing unit and make evaluations of use in representative areas of each unit based on species composition and normal grazing patterns in the unit (See Appendix G-3).
3. Maintain a photographic record of range conditions at established photo points.

MAINTENANCE

Maintain proper use by adjusting grazing as indicated by plant response and trend in range condition.

EFFECTIVENESS

Proper grazing use will improve range production and vegetative cover to reduce runoff and sediment delivery.

BMP 7-10 RANGE IMPROVEMENTS

DEFINITION

Improving the existing rangeland through specific treatments including seeding, planting, prescribed burning, and brush/weed management.

PURPOSE

To improve watershed quality, conserve soil and water resources and reduce sediment delivery; produce forage for livestock and wildlife; improve plant species diversity; and improve recreation, wildlife and the natural resource values of the land.

APPLICABILITY

Applies to grazing lands where the land does not have enough desired plant species diversity to recover in a reasonable period by management alone; where existing vegetation would out compete introduced plant materials; following wildfires or brush management treatment, and where soil, climate, and topography are suitable for establishment of the desired plant community.

PLANNING CRITERIA

Compile the necessary base line data to determine the specific range improvement best suited for the site. Consultation with a qualified range management professional in the private or public sector is recommended.

1. Determine site suitability for seeding or containerized planting - slope, soils, elevation, available moisture, etc.
2. Select species for seeding or planting that are adapted to the site. Mixtures of grasses, forbs, shrubs, etc. are better than single species plantings on most sites.
3. Determine the requirements for acceptable methods of site preparation, soil amendments, planting or seeding.

METHODS AND MATERIALS

The following practices can be utilized to improve rangelands (See Appendix G).

Pasture and Hayland Plantings - Establishing and reestablishing long-term stands of adapted species of perennial, biannual, or reseeding forage plants.

Range Seeding - Establishing adapted plants by seeding on native grazing land.

1. On tillable land, the soil should be tilled with a rangeland plow, chisel plow, or one-way disk. Depth should be as shallow as possible while still eliminating competing vegetation. Double plow if necessary. Perform operations across the slope or on the contour.
2. Pitting or contour furrowing may be used in special situations where complete tillage is not practical or desired, or where other tillage methods would create serious erosion hazards. Chain drags can be used where plowing is not feasible.
3. Tillage operations should leave as much plant residue on the soil surface as possible for seeding protection, moisture conservation and erosion control.
4. Seed with a rangeland drill or, on well-prepared seed beds, a grain drill equipped with agitator and depth regulators. Broadcast seed only on areas that are too rocky or where seeding is not practical for other reasons.
5. Fall or early winter seedings are best. Spring seedings can be used on small areas or sites that remain wet and cold into late spring. (See Cooperative Extension Publication C-183 for species, mixtures, and seeding rates.)

Critical Area Planting - Planting vegetation, such as trees, shrubs, vines, grasses or legumes on highly erodible or critically eroding areas.

Brush and Weed Management - Managing and manipulating stands of brush and weeds on range, pasture and other areas by mechanical, chemical, biological means or by prescribed burning (See Appendix G-7).

Prescribed Burning - Applying fire to predetermined areas when the intensity and spread of the fire are controlled. (See BMP 6-6, "Prescribed Use of Fire").

MAINTENANCE

1. Seedlings must not be grazed until the plants are well established. Usually it is necessary to protect seedlings from grazing for one full year and through the growing season of the second year. Some seedlings established during adverse weather cycles may need protection for a longer period.
2. After seedlings are established, follow established grazing management practices. (See BMP 7-9, "Proper Grazing Use" and BMP 7-8, "Planned Grazing System").

EFFECTIVENESS

Well established and managed range seedlings protect watersheds from excessive runoff, reduce runoff, reduce erosion and sediment delivery.

BMP 7-11 LIVESTOCK FACILITIES

DEFINITION

Livestock containment facilities are structures built or used to hold livestock, including but not limited to: corrals, holding pens, feed lots, barns and sheds.

PURPOSE

To reduce the degradation of surface runoff water quality and the potential to contaminate ground water resources resulting from the confinement of livestock.

APPLICABILITY

Applicable to areas where livestock are concentrated, such as horse corrals, feed yards, and holding pens. Runoff and leachate from these facilities can be high in nutrients from animal feeds and manure and create water quality problems especially if located near a streamside management area (SMA) or areas with a high water table.

PLANNING CRITERIA

The siting and construction of livestock containment facilities is important and sites should be carefully chosen based on the following guidelines.

1. Facilities should not be located in or near a SMA.
2. Facilities should not be located in areas subject to overland surface flow or flooding from upslope areas.
3. Facilities should be located on gently sloping to flat land (5% slope or less).
4. Facilities should not be located in areas which have less than four feet from the soil surface to the ground water table at any time of the year or areas having a high leaching potential.

In addition to the proper location of livestock confinement facilities, the following guidelines should be followed:

1. Surface runoff and related discharges from livestock containment facilities should be limited by:
 - * Storing both the facility waste water and the runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24 hour frequency storm. Storage structures should:
 - a. Have a compacted clay seal or plastic membrane lining, or
 - b. Be constructed with concrete, or
 - c. Be a storage tank.

- * Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system.
- 2. Surface runoff from these facilities or animal waste stockpile should not be allowed to flow into a SMA.
- 3. Stockpiling of animal waste should be thoroughly investigated for the potential to degrade the soil profile and ground water resources. Any runoff or drainage from animal waste stockpiles or the facility area should be routed to the runoff storage system.
- 4. Manure storage or animal waste piles should be protected from precipitation and surface runoff.
- 5. When applied to agricultural lands, manure, stored runoff water, stored facility waste water, and accumulated solids from the facility are to be applied utilizing appropriate nutrient management measures. An appropriate waste utilization system to minimize impacts to surface water and to protect ground water may be achieved through implementation of the SCS Waste Utilization Practice (633).
- 6. Anaerobic ponds can be used to reduce odors and solids, improve water quality and generate methane gas.

METHODS AND MATERIALS

Livestock confinement facilities should be located, designed, and constructed under the direction of qualified professionals. If the facility is to be served by vehicle, the site should have loading-unloading areas that are outside of SMAs.

MAINTENANCE

A comprehensive inspection and maintenance program should be developed based upon the specifics of the site. Inspections should be conducted regularly, particularly after precipitation or storm events and repairs made as required.

EFFECTIVENESS

Properly maintained and operated facilities can be effective in preventing the discharge of degraded surface runoff and minimize ground water quality degradation.

APPENDIX 10: PROPOSED GRAZING MANAGEMENT PRACTICES FOR WATER QUALITY IN CALIFORNIA

The Secretary of the Interior directed through regulations issued February 12, 1995 (43 CFR 4180) that each Bureau of Land Management (BLM) State Director develop standards and guidelines for rangeland health. The Fundamentals of Rangeland Health as identified in the regulations includes as one of the conditions that "Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM management objectives such as meeting wildlife needs. The regulations further state that the standards must address water quality and that guidelines must address maintaining, restoring or enhancing water quality to meet management objectives. The identified management practices (commonly known as best management practices (BMPs)) for grazing management in California will serve as refined guidelines for water quality purposes and will supplement and support the standards and guidelines developed for rangelands throughout California.

The following is the identification of the management practices that will serve as the best management practices (BMPs) for the Bureau of Land Management (BLM) to apply to grazing activities in meeting water quality objectives in California. The BMPs for grazing activities will be reflected in a BLM water quality management plan and will be but one element encompassing BMPs for all activities on public lands administered by BLM in California.

BLM Water Quality Management Objectives (to ensure consistency and conformance with the Federal Clean Water Act, Coastal Zone Act Reauthorization, and the Porter-Cologne Water Quality Control Act)

- A. BLM shall manage all rangelands under its jurisdiction to conform to, and be consistent with, the following:
 - (a) The intent of the Federal Clean Water Act to maintain, protect, and restore the physical, biological, and chemical integrity of the nation's water to the point that they are fishable, swimmable, and drinkable and
 - (b) Any and all requirements adopted by the U.S. Environmental Protection Agency, and by the state, regional or tribal authorities pursuant to the Federal Clean Water Act, Coastal Zone Act Reauthorization Amendments, and applicable state laws including:
 - 1. The Grazing Management Measures identified as guidance for implementing the Coastal Zone Act Reauthorization Amendment.
 - 2. Resolution no, 95-43 as adopted by the State Water Resources Control Board as recognition and adoption of the California Rangeland Water Quality Management Plan for privately owned rangelands.
- B. In the following areas, maintenance, protection and restoration of natural resources, the physical, chemical, and biological integrity of waters, and their beneficial uses shall be a primary management objective for the BLM.

- (a) Water bodies that provide or could provide aquatic habitat for Federal threatened or endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species,
 - (b) Watersheds draining into water bodies that have been listed or are proposed for listing as having threatened or impaired beneficial uses pursuant to the Federal Clean Water Act, and
 - (c) Riparian and wetland areas that are functioning or could function to protect the integrity and beneficial uses of water.
- C. Where the integrity of waters, their beneficial uses, and/or riparian/wetland functions are unimpaired, BLM shall maintain them consistent with existing land use plans and management practices. Where the integrity of waters, their beneficial uses, habitats of special status species, and/or riparian/wetland functions are threatened or are recovering from past impairment, protection thereof shall be of primary management importance for BLM and grazing practices that are known or suspected to contribute to the threat shall be subordinate to achieving recovery or elimination of the threat. Where the integrity of waters, their beneficial uses, habitats of special status species, and /or riparian/wetland function has been or is being impaired, restoration thereof shall be the primary objective for BLM and grazing use shall only be allowed to the degree that there is substantial evidence that it will not contribute to future impairment nor retard recovery.

Management Practices (or Best Management Practices(BMPs))

- A. Planning/Process BMPs
- 1. Develop and adopt appropriate rangeland management systems and/or prescriptions for each allotment. The factors to be considered in developing appropriate rangeland management systems and/or prescriptions shall include, but are not limited to, the following:
 - (a) The kind and class of livestock to be grazed.
 - (b) The intensity (stocking level), frequency, season, and duration of grazing;
 - (c) Pasture rotation and rest;
 - (d) Distribution of grazing pressure away from water bodies, riparian areas, wetlands and other sensitive areas (e.g. by fencing, herding, placement of feed supplements and alternative watering sites, rotation of concentrated use areas);
 - (e) Mulch management (residual dry matter (RDM) and/or stubble height) thresholds and/or utilization limits for specific forage species, desirable plants, or types of plant communities;

- (f) Location, design, construction, and maintenance of range improvement structures (e.g., watering, holding, and loading facilities, fences, trails, and roads) to avoid or minimize disruption of water body, riparian and wetland functions and discharges of animal wastes and sediment into water bodies;
 - (g) Land treatments to manage vegetation and/or control invasive or noxious species (e.g., prescribed fire, mechanical methods, seeding, planting, pesticides, biological controls);
 - (h) Coordination with other land uses and management directives (e.g., recreation, wild horses and burro management, mineral extraction and exploration, forest harvesting) to avoid cumulative watershed effects;
 - (i) Rangeland monitoring programs to determine implementation and effectiveness of standards, guidelines, and BMPs.
2. Where needed, more restrictive management practices shall be established for; (a) water bodies, (b) riparian areas, and (c) wetland areas. They should also be established in other special situations such as the following:
 - (a) Grazing at the end of the growing season and/or after fall dormancy;
 - (b) Presence of critical fisheries and/or special status species;
 - (c) Unstable stream bank or channel conditions or unhealthy riparian areas (those not fully meeting standards, or those "functioning at risk");
 - (d) Water bodies that have been listed as having threatened or impaired beneficial uses or provide habitat for threatened or endangered species.
 3. To protect annual grassland soils from erosion, specified end-of-season mulch management thresholds shall be developed and adopted.
 4. To protect designated ephemeral (annual and perennial) rangeland, reliable estimates of production will be made, and the level of annual growth, RDM, or desirable plant utilization on site at the end of the grazing season shall be specified and adopted.
 5. To protect native perennial rangelands, mulch management and plant utilization thresholds specific to the perennial species shall be developed and adopted.

B. Prescriptive BMPs

1. Continuous, season-long livestock grazing shall be allowed only when it has been demonstrated to be consistent with achieving healthy, properly functioning ecosystems and the integrity and beneficial uses of waters.
2. Development of water sources (including springs and seeps) or other projects affecting water and associated resources shall promote and maintain rangeland

health, economic and hydrologic function and processes of watercourses and riparian/wetland areas, and where practicable, year long use by wildlife.

3. Salt blocks, other supplemental feed, and alternate shade and water sources shall be located well away from water bodies and riparian/wetland areas.
4. New livestock management facilities (e.g. (holding corrals for short term use, watering facilities, trails, and roads) shall be located well away from water bodies and riparian/wetland areas and designed to minimize discharges of sediment and animal wastes to water bodies and groundwater.
5. If existing livestock management facilities that are located close to a water body or inside a riparian/wetland area threaten the integrity and beneficial uses of water, the threat shall be eliminated by modification to the design and use of the facility, by eliminating it, or by relocating it as a new facility.
6. Range improvement structures shall be constructed and maintained to function effectively in maintaining, protecting, and/or restoring the integrity and beneficial uses of water.
7. Land treatments to manage vegetation and/or control noxious and invasive plants shall be designed and implemented to avoid or minimize disruption of water body, riparian or wetland functions and/or discharges of sediments, ash, excessive nutrients, or pesticides into water bodies.
8. Livestock trailing, bedding, watering, loading, and other handling efforts, as well as use of roads and other facilities, shall be limited to those areas and times that will not retard or prevent attainment of the integrity and/or beneficial uses of water. Trailing in vernal pools and wetlands shall be avoided whenever possible. In steep terrain, stock trails may be developed to help divert livestock concentrations out of riparian and stream areas. Stream bottoms and banks need to be stabilized at frequently used livestock stream crossing locations and watering access locations to streams.
9. Any new permanent and long-term containment facilities for livestock or wild horses and burros (facilities used for other than temporally holding animals more than a few days) such as corrals, holding pens, feed lots, barns or sheds will adhere to the following guidelines:
 - (a) The siting and construction of the facilities should be carefully chosen based on the following guidelines and be located, designed, and constructed under the direction of qualified professionals.

Facilities should not be located near a stream or water body.

Facilities should not be located in areas subject to overland surface flow or flooding from upslope areas.

Facilities should be located on gently sloping to flat land (5% slope or less).

Facilities should not be located in areas which have less than four feet from the soil surface to ground water table at any time of the year or areas having a high leaching potential.

(b) Surface runoff and related discharges from livestock containment facilities should be limited by:

Storing both the facility waste water and the runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24 hour frequency storm. Storage structures should have a compacted clay seal or plastic membrane, be constructed with concrete, or be a storage tank. The stored runoff and accumulated solids from the facility need to be managed through an appropriate waste utilization system.

Surface runoff from these facilities or animal waste stockpile should not be allowed to flow into or near a stream or waterbody.

Stockpiling of animal waste should be thoroughly investigated for the potential to degrade the soil profile and ground water resources. Any runoff or drainage from animal waste stockpiles or the facility area should be routed to the runoff storage system.

Manure storage or animal waste piles should be protected from precipitation and surface runoff.

Anaerobic ponds can be used to reduce odors and solids, improve water quality and generate methane gas.

If the facility is served by vehicle, the site should have loading-unloading areas that are not near streams or water bodies.

(c) Inspections should be conducted regularly. A comprehensive inspection and maintenance program should be developed based upon the specifics of the site, particularly after precipitation of storm events, and repair made as required.

10. Approved livestock parasite control practices will be encouraged that reduce the probability of parasites and pathogens contaminating the water. Any pesticide use for this purpose will be in accordance with pesticide BMPs.

C. BMP Monitoring and Adaptive Management

1. BLM shall ensure that rangeland monitoring is conducted as needed in each allotment based on current accepted practices and techniques to determine utilization of forage resources and trend of rangeland health. Monitoring methodologies will be applicable to local conditions and developed in consultation with permittees/lessees and interested publics.

2. Rangeland monitoring to determine the implementation and effectiveness of the standards, guidelines, and BMPs shall be conducted in all special situations (as identified pursuant to Objective B and BMP A.2). Adaptive management shall be used especially in situations set forth in BMP A.2.
3. Appropriate adjustments (more or less restrictive) shall be made to guidelines, BMPs, and/or their implementation if ; (a) monitoring or verified observation indicates that one or more of the rangeland health standards is not being met or that substantial progress is not being made toward meeting a standard, and (b) if there is evidence that current rangeland management practices or guidelines are causing or contributing to this unsatisfactory condition.

APPENDIX 11: SPECIAL STATUS PLANT SPECIES

Appendix 11 shows the 159 special status plant species that are known to occur on BLM lands within the project area. Thirteen of these species are federally listed (10 endangered, 3 threatened) and 23 are state-listed (15 endangered, 3 threatened, and 9 rare).

Codes for the table are as follows:

Status: FE = Federal Endangered; FT = Federal Threatened; FC = Federal Candidate; PE = Proposed Federal Endangered; PT = Proposed Federal Threatened; CE = California Endangered; CT = California Threatened; CR = California Rare; BLMS = BLM Sensitive.

Effects of Livestock Grazing: UG = Ungrazed (i.e., not in an active grazing allotment); G = Grazed (i.e., within an active grazing allotment); Neutral = Although within an active grazing allotment, the species does not seem to respond either positively or negatively to grazing (this can also be because the species is in areas of allotments that are not frequented by livestock); Negative = Species is negatively impacted by livestock grazing, at least in a portion of its occurrence(s) on BLM lands; Positive = Species appears to benefit from grazing, at least in a portion of its occurrence(s) on BLM lands; ? = Effects of livestock grazing are unknown. A species can be both negatively and positively affected by livestock grazing depending on the timing of the grazing. For those species so indicated below, grazing during the active growing season of the species is considered negative, but grazing following the growing season is considered positive because it reduces the amount of residual dry matter and the resulting competition from tall growing annual grasses.

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Pink sand-verbena <i>Abronia umbellata</i> ssp. <i>breviflora</i>	BLMS	Arcata	UG
Jepson's onion <i>Allium jepsonii</i>	BLMS	Folsom	UG
Spanish Needle onion <i>Allium shevockii</i>	BLMS	Caliente	G, Neutral
Rawhide Hill onion <i>Allium tuolumnense</i>	PT	Folsom	G, Neutral (no evidence of grazing impacts)
Dimorphic snapdragon <i>Antirrhinum subcordatum</i>	BLMS	Clear Lake, Redding	UG
Bodie Hills rock cress <i>Arabis bodiensis</i>	BLMS	Bishop	G, Neutral

Species Common Name Scientific Name	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
McDonald's rock-cress <i>Arabis mcdonaldiana</i>	FE, CE	Arcata	UG
lone manzanita <i>Arctostaphylos myrtifolia</i>	FC	Folsom	UG
Nissenan manzanita <i>Arctostaphylos nissenana</i>	BLMS	Folsom	UG
Sand mesa manzanita <i>Arctostaphylos rudis</i>	BLMS	Caliente	UG
Field milk-vetch <i>Astragalus agrestis</i>	BLMS	Alturas, Eagle Lake	G, Neutral
Ash Valley milk-vetch <i>Astragalus anxius</i>	BLMS	Alturas	G, Neutral
Silverleaf milk-vetch <i>Astragalus argophyllus</i> var. <i>argophyllus</i>	BLMS	Bishop, Eagle Lake	G, Neutral (Eagle Lake) UG (Bishop)
Walker Pass milk-vetch <i>Astragalus ertterae</i>	BLMS	Caliente	G, ?
Geyer's milk-vetch <i>Astragalus geyeri</i> var. <i>geyeri</i>	BLMS	Eagle Lake	G, Negative
Long Valley milk-vetch <i>Astragalus johannis-howellii</i>	CR	Bishop	G, Negative (impacted by direct herbivory and trampling; about 25% of its BLM distribution is impacted in Long Valley and 10% in Bodie Hills; pop. density still high in both areas)
Lens-pod milk-vetch <i>Astragalus lentiformis</i>	BLMS	Eagle Lake	UG
Fish Slough milk-vetch <i>Astragalus lentiginosus</i> var. <i>piscinensis</i>	PE	Bishop	UG

Species Common Name Scientific Name	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Mono milk-vetch <i>Astragalus monoensis</i> var. <i>monoensis</i>	CR	Bishop	G, Negative (impacted by direct herbivory and trampling; about 15% of BLM distribution impacted)
Tonopah milk-vetch <i>Astragalus pseudodanthus</i>	BLMS	Bishop	G, Negative (impacted by direct herbivory and trampling; about 10% of BLM distribution impacted)
Pulsifer's milk-vetch <i>Astragalus pulsiferae</i> var. <i>pulsiferae</i>	BLMS	Eagle Lake	G, Neutral
Suksdorf's milk-vetch <i>Astragalus pulsiferae</i> var. <i>suksdorfii</i>	BLMS	Alturas, Eagle Lake	G, Neutral
Jepson's milk-vetch <i>Astragalus rattanii</i> var. <i>jepsonianus</i>	BLMS	Clear Lake	UG
Shevock's milk-vetch <i>Astragalus shevockii</i>	BLMS	Caliente	UG
Tiehm's milk-vetch <i>Astragalus tiehmii</i>	BLMS	Surprise	G, Neutral
Heart-leaved saltbush <i>Atriplex cordulata</i>	BLMS	Caliente	G, Neutral
Lost Hills saltbush <i>Atriplex vallicola</i>	BLMS	Caliente	UG
Woolly balsamroot <i>Balsamorhiza hookeri</i> var. <i>lanata</i>	BLMS	Redding	G, Neutral
Indian Valley brodiaea <i>Brodiaea coronaria</i> ssp. <i>rosea</i>	CE	Clear Lake, Redding	UG

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Leafy reedgrass <i>Calamagrostis foliosa</i>	CR	Arcata	G, Neutral (occurs almost exclusively in rock crevices and on rocky soils on very steep slopes)
Inyo mariposa <i>Calochortus excavatus</i>	BLMS	Bishop	G, Negative (impacted by direct herbivory and trampling; about 30% of BLM distribution impacted)
Greene's mariposa <i>Calochortus greenei</i>	BLMS	Redding	G, Neutral (although this species is impacted by herbivory, over 80% of this is due to deer and some wild horse use)
Alkali mariposa lily <i>Calochortus striatus</i>	BLMS	Caliente	G, Negative (small amount of species distribution impacted by direct herbivory, trampling and habitat degradation due to trespass grazing on 20 acre BLM parcel)

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Shirley Meadows star-tulip <i>Calochortus westonii</i>	BLMS	Caliente	G, Negative (impacted by trampling at 3 small occurrences on BLM lands; all other occurrences (probably 95% of distribution) is on Sequoia National Forest)
Stebbins' morning glory <i>Calystegia stebbinsii</i>	FE, CE	Folsom	UG
San Benito evening-primrose <i>Camissonia benitensis</i>	FT	Hollister	G, Negative and Positive (only a small portion of occurrence on BLM lands is grazed)
San Luis Obispo sedge <i>Carex obispoensis</i>	BLMS	Caliente	UG
Succulent owl's clover <i>Castilleja campestris</i> ssp. <i>succulenta</i>	PT, CE	Folsom	UG (Folsom)
California jewelflower <i>Caulanthus californicus</i>	FE, CE	Caliente, Hollister	UG (Caliente) G, Positive (Hollister; portion of habitat grazed only after flowering, which reduces the residual dry matter levels and appears to reduce competition from alien grasses)
Pine Hill ceanothus <i>Ceanothus roderickii</i>	FE, CR	Folsom	UG
Shasta chaenactis <i>Chaenactis suffrutescens</i>	BLMS	Redding	G, Neutral

Species Common Name Scientific Name	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Red Hills soaproot <i>Chlorogalum grandiflorum</i>	BLMS	Folsom	G, Negative (small portion of BLM occurrence grazed)
Straight-awned spineflower <i>Chorizanthe rectispina</i>	BLMS	Caliente, Hollister	UG
Ashland thistle <i>Cirsium ciliolatum</i>	CE	Redding	UG
Surf thistle <i>Cirsium rhotophilum</i>	FC, CT	Caliente	UG
Mariposa clarkia <i>Clarkia biloba</i> ssp. <i>australis</i>	BLMS	Folsom	G, Negative and Positive
Shasta clarkia <i>Clarkia borealis</i> ssp. <i>borealis</i>	BLMS	Redding	UG
Beaked clarkia <i>Clarkia rostrata</i>	BLMS	Folsom	G, ?
Mt. Hamilton coreopsis <i>Coreopsis hamiltonii</i>	BLMS	Hollister	UG
Silky cryptantha <i>Cryptantha crinita</i>	BLMS	Redding	G, Neutral
Schoolcraft's cryptantha <i>Cryptantha schoolcraftii</i>	BLMS	Surprise	G, Neutral
Piute cypress <i>Cupressus arizonica</i> ssp. <i>nevadensis</i>	BLMS	Caliente	G, ?
Bodie Hills cusickiella <i>Cusickiella quadricostata</i>	BLMS	Bishop	G, Neutral
Ornate dalea <i>Dalea ornata</i>	BLMS	Eagle Lake	G, Neutral?
July gold <i>Dedeckera eurekaensis</i>	CR	Bishop	UG
Kern County larkspur <i>Delphinium purpusii</i>	BLMS	Caliente	G, Neutral
Recurved larkspur <i>Delphinium recurvatum</i>	BLMS	Hollister	G, ?

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Kern mallow <i>Eremalche kernensis</i>	FE	Caliente	UG
Brandeggee's eriastrum <i>Eriastrum brandegeae</i>	CR	Arcata, Clear Lake, Redding	UG (Arcata, Clear Lake) G, Neutral (Redding)
Hoover's woollystar <i>Eriastrum hooveri</i>	FT	Caliente, Hollister	G, Neutral (Caliente -- occurs generally in areas that cattle do not favor; little if any direct herbivory; species highly tolerant of disturbance) G, Neutral to Positive (Hollister -- same situation as Caliente: cattle grazing appears to open up new potential habitat by reducing competing vegetation)
Blochman's leafy daisy <i>Erigeron blochmaniae</i>	BLMS	Caliente	UG
lone buckwheat <i>Eriogonum apricum</i> var. <i>apricum</i>	FC, CE	Folsom	UG
Crosby's buckwheat <i>Eriogonum crosbyae</i>	BLMS	Surprise	G, Negative (from trampling; <5% of its distribution on BLM lands has been impacted by livestock grazing)
Red Mountain buckwheat <i>Eriogonum kelloggii</i>	FC, CE	Arcata	UG

Species Common Name Scientific Name	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Snow Mtn. buckwheat <i>Eriogonum nervulosum</i>	BLMS	Clear Lake	UG
Mouse buckwheat <i>Eriogonum nudum</i> var. <i>murinum</i>	BLMS	Caliente, Hollister	G, Neutral
Prostrate buckwheat <i>Eriogonum prociduum</i>	BLMS	Alturas, Surprise	G, Neutral
Temblor buckwheat <i>Eriogonum tembloreense</i>	BLMS	Caliente	G, Neutral (except negative in places where cattle are trailed)
Humboldt Bay wallflower <i>Erysimum menziesii</i> ssp. <i>eurekaense</i>	FE, CE	Arcata	UG
Tuolumne fawn-lily <i>Erythronium tuolumnense</i>	BLMS	Folsom	G, Neutral
Pine Hill flannelbush <i>Fremontodendron decumbens</i>	FE, CR	Folsom	UG
Butte County fritillary <i>Fritillaria eastwoodiae</i>	BLMS	Redding	UG
Talus fritillary <i>Fritillaria falcata</i>	BLMS	Hollister	UG
Adobe-lily <i>Fritillaria pluriflora</i>	BLMS	Clear Lake, Redding	UG
El Dorado bedstraw <i>Galium californicum</i> ssp. <i>sierrae</i>	FE, CR	Folsom	UG
Modoc bedstraw <i>Galium glabrescens</i> ssp. <i>modocense</i>	BLMS	Surprise	G, Neutral
Hardham's bedstraw <i>Galium hardhamiae</i>	BLMS	Caliente	UG
Scott Mountain bedstraw <i>Galium serpicum</i> ssp. <i>scotticum</i>	BLMS	Redding	G, Neutral
Mendocino gentian <i>Gentiana setigera</i>	BLMS	Arcata	UG

Species Common Name Scientific Name	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Boggs Lake hedge-hyssop <i>Gratiola heterosepala</i>	CE	Alturas, Eagle Lake, Folsom, Redding	G, Neutral to possibly Negative (Alturas -- <10% of its distribution on BLM lands is grazed; monitoring has been unable to tease the effects of grazing from those of weather) UG (Eagle Lake) G, Neutral (Redding) UG (Folsom)
Drymaria-like western flax <i>Hesperolinon drymarioides</i>	BLMS	Clear Lake	UG
Tehama County western flax <i>Hesperolinon tehamense</i>	BLMS	Redding	UG
Parry's horkelia <i>Horkelia parryi</i>	BLMS	Folsom	G, Neutral
Sierra Valley ivesia <i>Ivesia aperta</i> var. <i>aperta</i>	BLMS	Eagle Lake	G, Negative (determination based upon observations of grazing impacts on US Forest Service lands, where most of it occurs; the limited BLM occurrence appeared fine when last visited, several years ago)
Alkali ivesia <i>Ivesia kingii</i> var. <i>kingii</i>	BLMS	Bishop	G, Negative (impacted by trampling; about 20% of distribution on BLM lands is impacted)
Ash Creek ivesia <i>Ivesia paniculata</i>	BLMS	Alturas	G, Neutral

Species Common Name Scientific Name	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Grimy ivesia <i>Ivesia rhypara</i> var. <i>rhypara</i>	BLMS	Surprise	G, Neutral
Webber's ivesia <i>Ivesia webberi</i>	BLMS	Eagle Lake	G, Neutral (occurs only in a corner of one allotment that is very slightly grazed)
Red Bluff dwarf rush <i>Juncus leiospermus</i> var. <i>leiospermus</i>	BLMS	Redding	UG
Beach layia <i>Layia carnosa</i>	FE, CE	Arcata	UG
Rayless tidytips <i>Layia discoidea</i>	BLMS	Hollister	UG
Pale-yellow layia <i>Layia heterotricha</i>	BLMS	Caliente, Hollister	G, Negative and Positive (species benefits from light and properly timed grazing but is negatively impacted by heavy grazing or grazing during peak flowering season)
Jones' layia <i>Layia jonesii</i>	BLMS	Hollister	UG
Munz's tidy-tips <i>Layia munzii</i>	BLMS	Caliente	G, ?
Legenere <i>Legenere limosa</i>	BLMS	Redding	UG

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
San Joaquin woolly threads <i>Lembertia congdonii</i>	FE	Caliente, Hollister	G, Negative and Positive (some negative impacts from direct herbivory and trampling, primarily in heavy use areas around water troughs, but some positive impacts from reduced competition; only 20% of BLM distribution is grazed in Caliente; research is ongoing)
Panoche pepper-grass <i>Lepidium jaredii</i> ssp. <i>album</i>	BMS	Hollister	G, Negative and Positive
Jared's pepper-grass <i>Lepidium jaredii</i> ssp. <i>jaredii</i>	BLMS	Caliente	UG
Cantelow's lewisia <i>Lewisia cantelovii</i>	BLMS	Folsom	UG
Sagebrush loeflingia <i>Loeflingia squarrosa</i> var. <i>artemisiarum</i>	BLMS	Bishop, Eagle Lake	G, Negative (impacted by direct herbivory and trampling in Bishop) (<25% of distribution in Eagle Lake impacted, primarily by trampling)
Congdon's lomatium <i>Lomatium congdonii</i>	BLMS	Folsom	G, Negative (small portion of BLM occurrence grazed)
Owens Peak lomatium <i>Lomatium shevockii</i>	BLMS	Caliente	G, Neutral

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Mariposa lupine <i>Lupinus citrinus</i> var. <i>deflexus</i>	PE, CT	Hollister	UG
Mono Lake lupine <i>Lupinus duranii</i>	BLMS	Bishop	G, Negative (impacted by direct herbivory and trampling; about 10% of its distribution on BLM lands is impacted)
Shaggyhair lupine <i>Lupinus spectabilis</i>	BLMS	Folsom	G, Neutral
Hall's madia <i>Madia hallii</i>	BLMS	Clear Lake	UG
Stebbins's madia <i>Madia stebbinsii</i>	BLMS	Redding	UG
Carmel Valley bush-mallow <i>Malacothamnus palmeri</i> var. <i>involucratus</i>	BLMS	Hollister	UG
Slender-stemmed monkeyflower <i>Mimulus filicaulis</i>	BLMS	Folsom	G, Neutral
Kaweah monkeyflower <i>Mimulus norrisii</i>	BLMS	Caliente	G, Neutral
Calico monkeyflower <i>Mimulus pictus</i>	BLMS	Caliente	G, Neutral (because the species generally occurs around the base of shrubs such as <i>Ribes</i> <i>quercetorum</i> and around rock outcrops, it is generally out of reach of cattle)
Kelso Creek monkeyflower <i>Mimulus shevockii</i>	PE	Caliente	G, Negative (impacted by trampling on about 10% of its BLM distribution)

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Crisp monardella <i>Monardella crisper</i>	BLMS	Caliente	UG
Piute Mountains navarretia <i>Navarretia setiloba</i>	FC	Caliente	G, ?
Shasta snow-wreath <i>Neviusia cliftonii</i>	BLMS	Redding	UG
San Joaquin Valley orcutt grass <i>Orcuttia inaequalis</i>	PE, CE	Folsom	UG
Slender orcutt grass <i>Orcuttia tenuis</i>	PT, CE	Alturas, Redding	UG
Little ricegrass <i>Oryzopsis exigua</i>	BLMS	Alturas, Eagle Lake	G, Neutral
Ahart's paronychia <i>Paronychia ahartii</i>	BLMS	Redding	G, Neutral (species exists in sizable numbers despite having been grazed continuously since the 1850's; ongoing monitoring inside and outside exclosure should provide additional information in a few years)
Dwarf lousewort <i>Pedicularis centranthera</i>	BLMS	Eagle Lake	G, Neutral
Closed-throated beardtongue <i>Penstemon personatus</i>	BLMS	Redding	UG
Slender pentachaeta <i>Pentachaeta exilis</i> ssp. <i>aeolica</i>	BLMS	Hollister	G, Negative and Positive
Scott Valley phacelia <i>Phacelia greenei</i>	BLMS	Redding	G, Neutral

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Mono County phacelia <i>Phacelia monoensis</i>	BLMS	Bishop	G, Negative (impacted by trampling and habitat alteration through invasion of exotic plants; about 30% of its BLM distribution is impacted)
Nine Mile Canyon phacelia <i>Phacelia novemmillensis</i>	BLMS	Caliente	G, Neutral (livestock season of use occurs after the seed set of this annual species)
Profuse-flowered pogogyne <i>Pogogyne floribunda</i>	BLMS	Alturas	G, Neutral
Modoc County knotweed <i>Polygonum polygaloides ssp. esotericum</i>	BLMS	Alturas	G, Neutral
Muir's raillardella <i>Raillardiopsis muirii</i>	BLMS	Caliente	G, Neutral
Sequoia gooseberry <i>Ribes tulareense</i>	BLMS	Caliente	G, Negative (impacted by some trampling and minor browsing on about 50% of its BLM distribution)
Hall's rupertia <i>Rupertia hallii</i>	BLMS	Redding	UG
Sanford's arrowhead <i>Sagittaria sanfordii</i>	BLMS	Redding	UG
Tracy's sanicle <i>Sanicula tracyi</i>	BLMS	Arcata	UG
Holmgren's skullcap <i>Scutellaria holmgreniorum</i>	BLMS	Alturas	G, Neutral
Red Mountain stonecrop <i>Sedum eastwoodiae</i>	FC	Arcata	UG

Species Common Name Scientific Name	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Canyon Creek stonecrop <i>Sedum paradisum</i>	BLMS	Redding	G, Neutral
Layne's butterweed <i>Senecio layneae</i>	FT, CR	Folsom	G, Neutral
Owens Valley checker-mallow <i>Sidalcea covillei</i>	FC, CE	Bishop	UG
Butte County checker-mallow <i>Sidalcea robusta</i>	BLMS	Redding	UG
Red Mountain campion <i>Silene campanulata</i> ssp. <i>campanulata</i>	FC, CE	Arcata	UG
Woolly stenotus <i>Stenotus lanuginosus</i>	BLMS	Alturas	G, Neutral
Socrates Mine jewel-flower <i>Streptanthus brachiatus</i> ssp. <i>brachiatus</i>	BLMS	Clear Lake	UG
Freed's jewelflower <i>Streptanthus brachiatus</i> ssp. <i>hoffmanii</i>	BLMS	Clear Lake	UG
Piute Mountains jewel-flower <i>Streptanthus cordatus</i> var. <i>piutensis</i>	BLMS	Caliente	G, Neutral
Three Peaks jewelflower <i>Streptanthus morrisonii</i> ssp. <i>elatus</i>	BLMS	Clear Lake	UG
Kruckeberg's jewelflower <i>Streptanthus morrisonii</i> ssp. <i>kruckebergii</i>	BLMS	Clear Lake	UG
Morrison's jewel-flower <i>Streptanthus morrisonii</i> ssp. <i>morrisonii</i>	BLMS	Clear Lake	UG
Masonic Mountain jewelflower <i>Streptanthus oliganthus</i>	BLMS	Bishop	G, Neutral
Red Hills vervain <i>Verbena californica</i>	PT, CT	Folsom	UG
El Dorado mule ears <i>Wyethia reticulata</i>	BLMS	Folsom	UG

APPENDIX 12: SPECIAL STATUS ANIMAL SPECIES

Appendix 12 shows the 43 special status animal species that are known or suspected to occur on BLM lands within the project area. 31 of these species are federally listed (20 endangered, 11 threatened) and 23 are state-listed (19 endangered, 4 threatened). Extirpated species are not included.

Codes for the table are as follows:

Status: FE = Federal Endangered; FT = Federal Threatened; FC = Federal Candidate; PE = Proposed Federal Endangered; PT = Proposed Federal Threatened; CE = California Endangered; CT = California Threatened; BLMS = BLM Sensitive.

Effects of Livestock Grazing: UG = Ungrazed (i.e., not in an active grazing allotment); G = Grazed (i.e., within an active grazing allotment); Neutral = Although within an active grazing allotment, the species does not seem to respond either positively or negatively to grazing (this can also be because the species is in areas of allotments that are not frequented by livestock); Negative = Species is negatively impacted by livestock grazing, at least in a portion of its occurrence(s) on BLM lands; Positive = Species appears to benefit from grazing, at least in a portion of its occurrence(s) on BLM lands; ? = Effects of livestock grazing are unknown. A species can be both negatively and positively affected by livestock grazing depending on the timing, location, or intensity of the grazing use.

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
San Joaquin antelope squirrel <i>Ammospermophilus nelsoni</i>	CT	Caliente	G, Neutral
Giant kangaroo rat <i>Dipodomys ingens</i>	FE, CE	Caliente, Hollister	G, Neutral
Fresno kangaroo rat <i>Dipodomys nitratoide exilis</i>	FE, CE	Caliente	UG
Tipton kangaroo rat <i>Dipodomys nitratoide nitratoide</i>	FE, CE	Caliente	G, Positive
San Joaquin Valley woodrat <i>Neotoma fuscipes riparia</i>	FC	Folsom	UG
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	FE, CT	Caliente, Hollister	G, Positive
Marbled murrelet <i>Brachyramphus marmoratus marmoratus</i>	FT, CE	Arcata	G, Neutral

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Aleutian Canada goose <i>Branta canadensis leucopareia</i>	FT	Folsom	UG
Swainson's hawk <i>Buteo swainsoni</i>	CT	Folsom, Redding	G, Neutral
Mountain plover <i>Charadrius montanus</i>	FC	Caliente	G, Positive
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	CE	Caliente	G, *
Willow flycatcher <i>Empidonax traillii</i>	CE	Alturas, Eagle Lake, Folsom	G, Negative
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	FE	Caliente	G, *
American peregrine falcon <i>Falco peregrinus anatum</i>	FE, CE	Arcata, Alturas, Clear Lake, Eagle Lake, Redding	G, Neutral
California condor <i>Gymnogyps californianus</i>	FE, CE	Caliente	G, Positive (dead livestock are potential food source)
Bald eagle <i>Haliaeetus leucocephalus</i>	FT, CE	Arcata, Alturas, Clear Lake, Eagle Lake, Redding	G, Neutral
Inyo California (=brown) towhee <i>Pipilo crissalis eremophilus</i>	FT, CE	Bishop	G, *
Great gray owl <i>Strix nebulosa</i>	CE	Arcata	UG
Northern spotted owl <i>Strix occidentalis caurina</i>	FT	Arcata, Alturas, Clear Lake, Redding	G, Neutral

Species Common Name Scientific Name	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Least Bell's vireo <i>Vireo bellii pusillus</i>	FE, CE	Caliente	UG
Black legless lizard <i>Anniella pulchra nigra</i>	PE	Hollister	G, Negative (only a small portion of BLM occurrence grazed, if any)
Blunt-nosed leopard lizard <i>Gambelia silus</i>	FE, CE	Caliente, Hollister	G, Positive
Giant garter snake <i>Thamnophis gigas</i>	FT, CT	Folsom, Hollister	UG
California tiger salamander <i>Ambystoma californiense</i>	FC	Hollister	G, Negative (only a small portion of BLM occurrence grazed, if any)
California red-legged frog <i>Rana aurora draytonii</i>	FE	Caliente, Hollister	G, Negative (only a small portion of BLM occurrence grazed, if any)
Modoc sucker <i>Catostomus microps</i>	FE, CE	Alturas	G, **
Warner sucker <i>Catostomus warnerensis</i>	FT	Surprise	G, **
Shortnose sucker <i>Chasmistes brevirostris</i>	FE, CE	Alturas	G, **
Owens pupfish <i>Cyprinodon radiosus</i>	FE, CE	Bishop	UG
Lost River sucker <i>Deltistes luxatus</i>	FE, CE	Alturas	G, **
Owens tui chub <i>Gila bicolor snyderi</i>	FE, CE	Bishop	UG
Cowhead Lake tui chub <i>Gila bicolor vaccaceps</i>	FC	Surprise	G, **
Lahontan cutthroat trout <i>Oncorhynchus clarki henshawi</i>	FT	Bishop	UG in currently occupied habitat

Species Common Name <i>Scientific Name</i>	Status	Resource Area(s) of Occurrence	Effects of Livestock Grazing Under Current Management
Coho salmon (Central California ESU) <i>Oncorhynchus kisutch</i>	FT	Clear Lake	G, **
West Coast steelhead (Northern CA ESU) <i>Oncorhynchus mykiss</i>	PT	Arcata	G, **
Winter-run chinook salmon <i>Oncorhynchus tshawytscha</i>	FE, CE	Redding	G, **
San Joaquin dune beetle <i>Coelus gracilis</i>	BLMS	Hollister	G, Negative (only a small portion of BLM occurrence grazed, if any)
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	FT	Folsom, Hollister	G, Negative (only a small portion of BLM occurrence grazed, if any)
Kern primrose sphinx moth <i>Euproserpinus euterpe</i>	FT	Caliente	UG
Conservancy fairy shrimp <i>Branchinecta conservatio</i>	FE	Caliente, Hollister	G, Neutral
Longhorn fairy shrimp <i>Branchinecta longiantenna</i>	FE	Caliente, Hollister	G, Neutral
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	FE	Caliente, Hollister	G, Neutral
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	FE	Caliente, Hollister	G, Neutral

* For these bird species, suitable habitat may occur on public lands, but BLM surveys have not documented the species as occurring there.

** These fish species occur within the watershed, and there is some habitat on public lands; however, the amount of habitat on public land compared to the amount on adjacent private lands is so small that actions taken on public lands will have negligible impact upon the species.

APPENDIX 13: WILDERNESS STUDY AREAS and WILDERNESS AREAS

The following tables contain complete lists of those wilderness study areas and designated wilderness areas within the EIS analysis area that are grazed or partially grazed. The acreages given are the total acreage of the unit, not the amount of the unit that is actually grazed.

TABLE A.4.1: WILDERNESS STUDY AREAS GRAZED		
BAKERSFIELD DISTRICT (Caliente, Bishop, Folsom, Hollister RA)		
WSA Number	WSA Name	Acres
CA-010-022	Sheep Ridge (202 WSA)	5,102
CA-010-023	Milk Ranch / Case Mountain (202 WSA)	8,970
CA-010-026	Owens Peak (partial)	310
CA-010-027	Sacatar Trails	140
CA-010-029	Rockhouse	310
CA-010-030	Scodie (202 WSA)	420
CA-010-032	Domeland (202 WSA)	40
CA-010-042	Caliente Mountain	17,590
CA-010-045	Kelso Creek Valley (202 WSA)	120
CA-010-057	Independence Creek	6,458
CA-010-062	Crater Mountain	7,069
CA-010-064	Symmies Creek	7,694
CA-010-079	Chidago Canyon	19,702
CA-010-080	Fish Slough	14,700
CA-010-081	Volcanic Tablelands	12,499
CA-010-082	Casa Diablo	5,325
CA-010-088	Excelsior (north 1/2)	9,383
CA-010-090	Granite Mountain	54,178
CA-010-092	Walford Springs	12,840
CA-010-094	Mormon Meadow	7,721
CA-010-095	Mount Biedeman	13,069
CA-010-099	Bodie Mountain	23,934

BAKERSFIELD DISTRICT (Caliente, Bishop, Folsom, Hollister RA)		
WSA Number	WSA Name	Acres
CA-010-100	Bodie	16,482
CA-010-102	Masonic Mountain	6,493
CA-010-105	Slinkard	6,268
CA-040-301A	Panoche Hills North	6,631
CA-040-301B	Panoche Hills South	11,229
CA-040-303	Pinnacles (202 WSA)	5,949
TOTAL	Number of WSAs = 28	280,626

Eagle Lake, Alturas, Surprise RA		
WSA Number	WSA Name	Acres
CA-020-103	Pit River Canyon	11,724
CA-020-211	Tule Mountain	16,998
CA-020-311	Tunnison Mountain	19,884
CA-020-604	Bitterbrush ISA	640
CA-020-609	Five Springs	49,206
CA-020-612	Skedaddle	62,010
CA-020-708	South Warner Contig. (202 WSA)	4,330
CA-030-201	Timbered Crater (includes Baker Cypress ISA (CA-030-301))	17,896 (1,148)
CA-030-203	Lava	10,770
CA-020-615	Dry Valley Rim	94,308
CA-020-619	Buffalo Hills	46,143
CA-020-619A	Twin Peaks	90,791
CA-020-805	Wall Canyon	46,305
CA-020-913 NV-020-008	Little High Rock Canyon	50,951
CA-020-913A	Yellow Rock Canyon	12,468
CA-020-913B	High Rock Canyon	34,758
CA-020-914 NV-020-006A	E. Fork High Rock Canyon	52,639

Eagle Lake, Alturas, Surprise RA		
WSA Number	WSA Name	Acres
CA-020-1012	Sheldon Contiguous	23,700
CA-020-1013 NV-020-012	Massacre Rim	101,290
CA-020-618 CA-020-621	Poodle Mountain	28,000
TOTAL	Number of WSAs = 20	774,811
Arcata, Clear Lake, Redding RA		
WSA Number	WSA Name	Acres
CA-030-501	Yolla Bolly Contig. (202 WSA)	646
CA-050-112	King Range	33,485
CA-050-211	Big Butte (202 WSA)	2,408
CA-050-212	Thatcher Ridge	16,918
CA-050-214	Eden Valley	6,166
CA-050-317	Rocky Creek / Cache Creek	33,561
TOTAL	Number of WSAs = 6	93,184
Total WSAs Currently Grazed = 54		1,148,621 acres

TABLE A.4.2: WILDERNESS AREAS CURRENTLY GRAZED	
Wilderness Name	Acres
Caliente Resource Area	
Chimney Peak	13,700
Domeland Additions	36,300
Kiavah	16,090
Owens Peak	24,934
Sacatar Trail	17,612
Machesna Mountain	120
Santa Lucia	1,733
Number of Wilderness Areas = 7	Total Acres = 110,489

Again, the acreages given are the total size of the wilderness study area or wilderness area, not the amount of the area that is actually grazed.

APPENDIX 14: SOIL STANDARDS

The following Table displays the soil resource parameters that must be addressed by the rangeland health standards, as identified in 43 CFR 4181.2; and shows whether they are addressed by the Soils Standards in the different alternatives in Chapter 2. The standards listed are the Soil Standards for the individual RACs, from Alternative 1; the State-wide Soils Standard from Alternative 2; and the "Fallback Standard" from Alternative 3. The Standard used in Alternative 4 is identical to the State-wide Standard in Alternative 2 and is not listed on the Table. The Standard used in Alternative 5 is identical to Alternative 1 except as described below for Susanville RAC area, and where different is indicated by an "X."

SOIL STANDARDS, COMPARISON OF THE PROPOSED CONTENTS					
ITEM	UKIAH RAC	SUSAN-VILLE RAC	BAKERS-FIELD RAC	FALLBACK STANDARDS	STATE-WIDE STANDARDS
infiltration	Y	Y	Y	Y	Y
permeability	Y	Y	¹	Y	Y
fertility	Y	Y	Y	¹	Y
biological function	Y	Y	Y	¹	Y
chemical function		Y			
physical function	Y	Y	Y	¹	Y
erosion	Y	Y	Y		Y
litter	Y	X ²	Y		Y
crusting-biological	Y		Y		Y
crusting-physical	Y		Y		Y
ground cover	Y	X ²	Y	¹	Y
compaction	Y		Y		Y
structure					Y
vegetation-diversity	Y	Y	Y	Y	Y
root depths	Y		Y		Y

¹ - Mentioned in Guidelines.

² - These apply only to Alternative 5, not Alternative 1

This comparison of the various soil properties or functions shows that each RAC proposal meets or exceeds the minimum standards presented in the Fallback standard with one exception. The Bakersfield RAC proposal does not refer to soil permeability in the standards; however it does in the guidelines.

Alternative 1: RAC Standards

Susanville RAC Standard

The standard for this proposal addresses some of the soil quality issues which influence watershed function. The standard specifically mentions infiltration and permeability; the biological, chemical and physical functions; adequate erosion protection; and soil fertility appropriate for the soil type. Criteria for measuring compliance with the standard is wind or water erosion evidence; vegetation vigor, age diversity, and composition diversity. Vegetation which reflects the potential natural vegetation or desired plant community for the site is another soil criteria. Conspicuously absent is any mention of litter cover, soil crusts (either biological or structural), or soil compaction.

This standard appears to minimally address the issues presented in the Fallback Standard. Issues which are not specifically addressed are surface litter, soil compaction and surface crusts. In the drier regions of the Susanville RAC area surface crusts are an important issue which influence infiltration, seed germination and susceptibility to wind erosion. Ignoring this issue may result in resource degradation.

Ukiah RAC Standard

The standard for this proposal specifically addresses all the soil properties which influence watershed function. Indicators of full function include ground cover, litter, plant species diversity, diverse root depths, vigorous plant growth, minimal evidence of accelerated erosion, absence of surface crusts or compaction layers and intact biological crusts.

This standard appears to meet or exceed those defined for the Fallback Standard and, if followed by those responsible for managing the resources, will improve or protect the soil resources.

Bakersfield RAC Standard

The standard for this proposal addresses all of the issues presented in the fallback standard except permeability; however physical function is mentioned. Indicators of full function include ground cover, litter, biological and physical characteristics, adequate erosion protection, fertility, plant diversity, root depth diversity, vigorous plants, absence of physical crusts or compaction layers, and intact biological crust.

This standard appears to meet or exceed those defined for the Fallback Standard and, if followed by those responsible for managing the resources, will improve or protect the soil resources.

Alternative 2: Statewide Standard

This alternative proposes a single, state-wide standard and would use the individual RAC guidelines. The standard is comprehensive and addresses all of the soil resource issues presented in all other standards.

This alternative incorporates the missing elements -- soil crusts, soil compaction and litter -- into the Susanville RAC geographic area. Since the Susanville guidelines contain all the livestock management tools necessary to achieve these standards, this alternative would adequately protect or initiate movement toward improvement of the soil resource throughout the geographic area covered by this document if implemented by resource managers.

Alternative 3: Fallback Standard

These standards are general and fail to mention some important issues addressed by the locally developed standards of the individual RACs. Erosion is not mentioned in this standard, although this fact is mitigated by the term "soil stability" which is a less commonly used reference than erosion. Litter, physical and biological crusts and compaction are not specifically mentioned in the fallback standard, however "physical condition" is referred to in the guidelines. The general nature and omission of some specific soil parameters important to watershed function may make this standard less successful at improving or protecting the soil resources than Alternative 2.

Alternative 4: Rapid Improvement Standard

This alternative proposes a single, state-wide standard that is the same as that in Alternative 2. The standard is comprehensive and addresses all of the soil resource issues presented in all other standards.

Alternative 5: Preferred Alternative (modification of Alternative 1)

This alternative is similar to Alternative 1 but includes modifications which incorporate Draft EIS comments, RAC modifications, and modifications suggested by BLM staff. Specifically, the following criteria was added to the Susanville RAC Standard 1: "Ground cover (vegetation, litter, and other types of ground cover such as rock fragments) is sufficient to protect sites from accelerated erosion."

This modification addresses the shortcomings of Alternative 1 discussed under Alternative 1, Susanville RAC Standards, above. Management for adequate soil cover will protect the soil from accelerated erosion, improve seed germination, reduce crusting and improve infiltration.

APPENDIX 15 -- CLARIFICATION OF WATER QUALITY STANDARD FOR SUSANVILLE PORTION OF ALTERNATIVE 5

While the wording of the Susanville RAC recommendation for a water quality standards remains much the same, the RAC wished to make it clear that the intent was to meet all requirements. Therefore, this appendix is the basis for how that standard should be interpreted and implemented.

Standard:

Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the State standards within the respective boundaries of the States of California and Nevada.

Management Objective: For water bodies, the primary objective is to maintain the existing quality and beneficial uses of water, protect them where they are threatened (and livestock grazing activities are a contributing factor) and restore them where they are currently degraded (and livestock grazing activities are a contributing factor). This objective is of even higher priority in the following situations:

- (a) where beneficial uses of water bodies have been listed as threatened or impaired pursuant to Section 303(d) of the Federal Clean Water Act;
- (b) where aquatic habitat is present or has been present for Federal threatened or endangered, candidate, and other special status species dependent on water resources; and,
- (c) in designated water resource sensitive areas such as riparian and wetland areas.

Meaning That:

BLM will, pursuant to the Clean Water Act:

Maintain the physical, biological, and chemical integrity of waters flowing across or underlying the lands it administers;

Protect the integrity of these waters where it is currently threatened;

Insofar as is feasible, restore the integrity of these waters where it is currently impaired;

Not contribute to pollution and immediately remedy any pollution resulting from its actions that violates applicable California (including the requirements identified in Regional Basin Plans), Nevada or Tribal water quality standards or other applicable water quality requirements (e.g., requirements adopted by SWRCB or RWQCB in California, Nevada Division of Environmental Protection, or US EPA pursuant to Section 303(d) of the Clean Water Act or the Coastal Zone Reauthorization Act).

Be consistent with the non-degradation policies identified in the Regional Basin Plans in California and non-degradation policies applicable to Nevada.

Work with the states (including the Regional Water Quality Control Boards in California) and USEPA to establish appropriate beneficial uses for public waters, establish appropriate numeric targets for 303(d)-listed water bodies, and implement the applicable requirements to ensure that water quality on public lands meets the criteria for the designated beneficial uses of the water.

Reasonably implement Best Management Practices (BMPs) approved by the SWRCB and the Nevada Division of Environmental Protection to protect and restore the quality and beneficial uses of water, and monitor both implementation and effectiveness of the BMPs.

As Indicated By:

- * The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen.
- * Achievement of the standards for riparian, wetlands, and water bodies.
- * Aquatic organisms and plants (e.g., macroinvertebrates, fish, algae and plants) indicate support for beneficial uses.
- * Acceptable results from implementation and effectiveness monitoring or changes in management to address deficiencies identified by such monitoring.

Exceptions:

Within California, impoundments (stock ponds) and water troughs that have a sustained discharge yield of less than 200 gallons per day to surface or groundwater. Other water bodies may be excepted from meeting drinking water requirements as per SWRCB Resolution No. 88-63.

Within Nevada, livestock water facilities or impoundments specifically developed for that use are excepted as per Nevada Water Quality Regulations 445A.120 from meeting any stricter water quality standards than for the purposes of livestock water.

APPENDIX 16: ADEQUACY OF WATER QUALITY STANDARDS AND GUIDELINES

The following discusses the adequacy of the Water Quality Standards and Guidelines in the different alternatives in meeting the requirements identified in 43 CFR 4181.2. The standards listed are the Water Quality Standards and Guidelines for the individual RACs, from Alternative 1; the State-wide Water Quality Standard from Alternative 2 and the Standards and Guidelines from Alternative 4. The Fallback Standards and Guidelines from Alternative 3, which are verbatim repeated from the regulations, are also listed, but they fail to specifically address water quality requirements. The proposed action, Alternative 5, modified and expanded the standards and guidelines from Alternative 1 in an attempt to meet the concerns identified in the draft EIS, including the following analysis of the alternatives, comments to the draft EIS, and suggestions from State, Regional and other Federal agencies.

ALTERNATIVE 1

In December 1996 a BLM-wide team reviewed all of the recommended RAC standards and guidelines for California while reviewing standard and guideline submissions for some of the other western states that were preparing their recommendation to the Secretary of the Interior for final approval. The comments and recommendations from the team for California's RAC recommendations that specifically address water quality are incorporated in this discussion. This group did not see or address the other alternatives.

BAKERSFIELD RAC RECOMMENDATIONS

Standards -- The water quality standard is "Surface and ground water complies with California, or other appropriate (e.g. Nevada or Tribal water quality standards)".

The review team commented: The "meaning that" portion of the water quality standard is phrased in the terminology of a guideline, i.e., actions, techniques and practices to achieve a standard, rather than further defining the standard as a clear statement of condition or function.

Guidelines -- Guidelines 1, 2, 5, 9, 10 and 13 support water quality needs. Guidelines 12, 14 and 15 are more directly supportive to water quality needs in protection of water sources and riparian/wetland areas; and Guideline 16 states to "implement grazing systems that will promote compliance with Water Quality Standards".

Overall the guidelines adequately provide for most anticipated grazing activities that may influence water quality. An additional guideline that might have been included that would have improved the guidelines is the development of any water gaps on streams would provide for hardened watering access for livestock watering purposes.

UKIAH RAC RECOMMENDATIONS

Standards -- The water quality standard is "With the exception of off-stream artificial impoundments, surface and groundwater quality complies with California, Tribal and Federal water quality standards (WQS)".

The review team commented: The opening phrase sets up an exception to the standard, thus obscuring the level of condition or degree of function to be attained. The "meaning that" portion of the water quality standard is phrased in the terminology of a guideline, i.e., actions, techniques, and practices to achieve a standard, rather than further defining the standard as a clear statement of condition or function.

The exception identified for "off-stream, artificial impoundments," that structural facilities constructed for livestock grazing and other purposes are to be exempted from meeting the state water quality standards, raises the concern that those sites may not meet the non-degradation objectives for water quality for non-point sources, and might therefore be subject to more stringent regulation similar to point sources of pollution (including the requirement of obtaining a permit).

Guidelines -- The review team commented: Guiding principles are not addressed in the guidelines for "maintaining, restoring, or enhancing water quality".

Guidelines 2, 3, 4, 5 and 7 for riparian areas and Guideline 3 for annual upland ranges support water quality protection. A possible additional guideline might have been included that said the development of any water gaps on streams would provide for hardened watering access for livestock watering purposes.

SUSANVILLE RAC RECOMMENDATIONS

Standards -- The water quality standard is "At a minimum, water quality is adequate for desired beneficial use of water resources on public lands."

The review team commented: The water quality standard does not specifically refer to State water quality standards as addressed in Fundamental (c). The statement "adequate for desired beneficial use" does not indicate whose desired beneficial use is established. Use of the word "desired" in the standard does not indicate a clear level of condition or degree of function.

Guidelines -- The review team commented: Guiding principles are addressed for "maintaining, restoring, or enhancing water quality".

Although guideline 1 supports minimizing impacts from grazing activities along streams by emphasizing use level and trampling that would in turn improve water quality, there is a lack of guidelines addressing specific types of measures to help prevent livestock related water quality influences at or near water sources such as minimizing concentrations of livestock and influences to water quality and establishing determinable threshold parameters for grazing management in these areas.

STATE-WIDE CONSISTENCY/CONSOLIDATED STANDARDS AND GUIDELINES -- ALTERNATIVE 2

Standards -- The water quality standard is: "Water will have the characteristics suitable for existing or potential beneficial uses".

This standard was developed with the intent of leaving some flexibility in meeting specific state numerical water quality standards, particularly for drinking water, as identified in some of California's Regional Basin Plans. The rationale for this approach is based upon a difference in interpretation and opinion about the applicability of the state's numerical objectives for drinking water to livestock grazing activities. One interpretation is that strict adherence to the numerical standards would only apply where the water is actually used for drinking water purposes and the water could not be treated for potable purposes or where the water must meet the standard prior to any treatment. The other interpretation is that the state's numerical standards apply no matter what the circumstance.

This alternative focuses on working with the State of California and the Regional Boards to revisit the Basin Plans, and make new determinations of the beneficial uses. The intent is that BLM and the State of California would jointly determine what the new standards would be.

Although the description of this standard explains cooperative processes for BLM and the State of California to jointly determine what standards may be applicable for grazing on public land, it does not address BLM's need to adhere to existing standards established by both California and Nevada and the Indian tribes where appropriate.

Guidelines -- The guidelines are the same as the RAC guidelines for the respective RAC areas in the proposed action.

FALLBACK STANDARDS AND GUIDELINES -- ALTERNATIVE 3

Standards -- There is no standard for water quality in this alternative. It therefore fails to meet the requirements of the regulations.

Guidelines -- There is no guideline that specifically addresses water quality under this alternative, although Guidelines 3, 4, 13, and 14 address riparian, wetland and stream channel functioning condition, thereby indirectly addressing the issue.

RAPID IMPROVEMENT/RAPID RECOVERY STANDARDS AND GUIDELINES -- ALTERNATIVE 4

Standards -- The standard is: "Surface and groundwater quality complies with California or Nevada, and other appropriate (e.g. Tribal) water quality standards."

The standard and its supportive description clearly meet the requirements of the Fundamentals. For this standard as well as for the other proposed standards, a reference to the documents that actually identify the standards, such as referring to the water quality objectives identified in the California Regional Basin Plans and the State of Nevada's water

quality regulations, would give the standard a more localized relationship to the BLM situation in California.

Guidelines -- Guideline 10 directs implementation to meet water quality objectives, but is not specific about how this should be done. Similarly, it is implied in guideline 1 that the listed set of adjustments would be applied appropriately for protecting water quality; however, it may not be clear what specific types of situations would occur for any of these guidelines to be applied. Also there are no guidelines for specifically minimizing livestock concentration influences to water quality.

THE PROPOSED ACTION -- ALTERNATIVE 5

Standards -- These standards modified and expanded the standards identified in Alternative 1 and developed consistent standards for all three RAC areas. The description of the standards further describes the indicators for water quality and more specifically reference meeting the water quality requirements of both States and the basic applications of management such as implementing best management practices and monitoring. Exceptions to the standards for stockwater facilities were further defined, which had been an issue of concern and confusion during the development of the draft EIS.

Guidelines -- In addition to retaining the existing water quality guidelines from Alternative 1, guidelines were added that emphasize the application of best management practices (BMPs) and that management attention be focused where water quality may be impaired or threatened from grazing activities. Recognizing the BMPs in this alternative as part of the guidelines should alleviate some of the concern about management related omissions in some of the other alternatives.

APPENDIX 17: NOXIOUS WEED MANAGEMENT

The Bureau of Land Management is directed to manage noxious weeds on public lands as outlined in the following laws, regulations, and policies:

Federal Land Policy and Management Act of 1976

Directs the BLM to "take any action necessary to prevent unnecessary and or undue degradation of the public lands."

Public Rangelands Improvement Act of 1978

Requires that BLM will manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible.

Carlson-Foley Act of 1968

Directs agency heads to enter upon lands under their jurisdiction with noxious plants and destroy noxious plants growing on such land.

Federal Noxious Weed Act of 1974, as amended by Sec. 15 - Management of Undesirable Plants on Federal Lands, 1990

Authorizes the Secretary "to cooperate with other federal and state agencies, and others in carrying out operations or measures to eradicate, suppress, control, prevent, or retard the spread of any noxious weed. Each federal agency shall 1) designate an office or person adequately trained to develop and coordinate an undesirable plants management program for control of undesirable plants on federal lands under the agency's jurisdiction, and 2) establish and adequately fund an undesirable plants management program through the agency's budgetary process, 3) complete and implement cooperative agreements with State agencies regarding the management of undesirable plant species on federal lands, and 4) establish integrated management systems to control or contain undesirable plant species targeted under cooperative agreements."

California Vegetation Management Final Environmental Impact Statement (1988)

Control of vegetation using integrated pest management methods.

Departmental Manual 517

Prescribes policy for the use of pesticides on the lands and waters under its jurisdiction, and for compliance with the Federal Insecticide, Fungicide, and Rodenticide Act, as amended.

Departmental Manual 609

Prescribes policy to control undesirable or noxious weeds on the lands, waters, or facilities under its jurisdiction to the extent economically practicable, and as needed for resource protection and accomplishment of resource management objectives.

BLM Manual 9011 and Handbook H-9011-1

Provides policy for conducting chemical pest control program under an integrated pest management approach.

BLM Manual 9014

Provides guidance and procedures for planning and implementing biological control in integrated pest management programs.

BLM Manual 9015

Provides policy relating to the management and coordination of noxious weed activities among BLM, organizations, and individuals.

Partners Against Weeds: An Action Plan for the Bureau of Land Management (1996)

Outlines strategies for achieving the following goals: 1) Prevention and Detection; 2) Education and Awareness; 3) Inventory; 4) Planning; 5) Integrated Weed Management; 6) Coordination; and 7) Monitoring, Evaluation, Research and Technology Transfer.

Memorandum of Understanding between Federal and State agencies in California (signed by BLM in 1994)

"To coordinate the management of undesirable plants on Federal and State Lands."

In accordance with federal laws, regulations, and policies, California BLM has developed a noxious weed management program that receives funding support from both internal (Congressional appropriation) and external alternative funding sources. BLM and alternatively funded noxious weed projects within the scope of this EIS are listed below. As these projects reach completion the funding will be transferred to projects listed in the unfunded project table. The noxious weed coordinator(s) listed in the last table are responsible for the coordination of cooperative weed control efforts, inventory, prevention, monitoring, detection, and evaluation within their respective Field Office boundaries. Certified herbicide applicators are also listed along with the expiration dates of their certification.

Summary of BLM Funded Projects

Field Office	Project	Start	Funding
Eagle Lake	Noxious Weed SWAT Team	97	\$5,000
	County spray contracts	98	\$5,000
	Purchase of 1 more GPS unit for mapping	98	\$3,000
	Purchase of computer equipment for Siskiyou County database.	98	\$1,000
	Project will test the ability of satellite imagery to detect weed infestations in NW Nevada	98	\$5,000
	Develop a Weed Prevention & Analysis Plan and educational materials, including a weed calendar, for NORCAL	98	\$10,000
Surprise	GPS mapping of Resource Area and creation of a database.	98	\$10,000
	County contract	98	\$7,000
Alturas	Modoc Plateau Weed Manual	97	\$7,000
	County contracts	98	\$15,000
	Cooperative program with the Lassen County Dept of Ag to combat an explosion of squarrose knapweed and dyer's woad.	98	\$10,000
Arcata	European Beachgrass control on Manila dunes ACEC	98	\$20,000
Redding	Weed mapping/eradication	98	\$5,000
Hollister	Initiate a large-scale control program at Fort Ord.	98	\$30,000
Bishop	Phase II of inventory: mapping using GPS, creation of a database.	97	\$4,000
Clear Lake	Tamarisk removal Cache Creek	98	\$5,000
Folsom	Cosumnes starthistle control	98	\$4,000
Bakersfield	Removal of 2 acres of yellow starthistle	97	

Summary of Alternately Funded Projects

Office	Funding/Project	Year	Amount
Eagle Lake	NFWF Pulling Together: Lassen County Noxious Weed Project	97	\$10,500
Arcata	NFWF Native Plant Conservation: Manila dunes ACEC European Beachgrass removal	97	\$41,200
Hollister	NFWF Pulling Together: Fort Ord	98	\$50,000

Summary of Unfunded Projects

Office	Project	Amount
Eagle Lake	Additional county spraying	\$5,000
Surprise	Weed inventory support	\$26,000
Redding	Weed mapping/eradication area-wide	\$11,000
Folsom	Area-wide weed control	\$9,000
	Cosumnes starthistle control phase II	\$2,000
Clear Lake	Cache Creek saltcedar control phase II	\$5,000
	Starthistle conversion Cache Creek	\$4,000

Noxious Weed Coordinators & Certified Herbicide Applicators

Office	Coordinator	Phone #	Certification Expiration
Eagle Lake	John Bosworth (Coord. & Cert.)	(916) 257-5381	12/00
	Fred Scott (Cert.)	(916) 257-0456	6/98
	Carol Gibbs (Coord)	(916) 257-0456	
Surprise	Alan Uchida (Coord. & Cert.)	(916) 279-6101	6/00
Alturas	Michael Dolan (Coord. & Cert.)	(916) 233-4666	6/99
	Martha Butow (Cert.)	(916) 233-4666	6/00
Arcata	Jennifer Anthony-Wheeler (Coord.)	(707) 825-2316	
Redding	Joe Molter (Coord.)	(916) 224-2130	
Hollister	Bruce Cotterill (Coord.)	(408) 637-8183	
Bishop	Anne Halford (Coord.)	(760) 872-4881	
Clear Lake	Pardee Bardwell (Coord.)	(707) 468-4055	
	Toby Ringuette (Cert.)	(707) 468-4072	6/98
Folsom	Al Franklin (Coord.)	(916) 985-4474	
	Robert Smith (Cert.)	(916) 985-4474	6/00
Bakers-field	Susan Carter (Coord.)	(805) 391-6115	

APPENDIX 19: IMPACTS COMPARISON BY ALTERNATIVE

The following table shows a side-by-side comparison of the impacts identified in Chapter 4 for each alternative. For more explanation, see Chapter 4.

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Grazing Management				
Reduction of 11,712 AUMs in first 5 years, carrying through implementation phase until recovery	Same as Alt 1	Same as Alt 1	Reduction of 25,849 AUMs in first 5 years, until recovery	Same as Alt 1
Changes to grazing systems, some exclusions, range improvements (see Table 4.3.1)	Same as Alt 1	Same as Alt 1	Same as Alt 1, except increased number and magnitude of changes (see Table 4.3.1(b))	Same as Alt 1
Cost to BLM to implement projects = \$1.6 million	Same as Alt 1	Same as Alt 1	Cost to BLM to implement projects = \$2.6 million	Same as Alt 1
Current BLM Personnel	Same as Alt 1	Same as Alt 1	Need 18 FTE and \$180,000 operating expenses above current funding levels for 5 years	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Upland Soils				
Improved watershed health over the long term with: Reduced surface crusting; reduced erosion; increased biological activity; increased permeability; increased root mass; increased fertility; increased soil cover; increased soil moisture	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Weed infestations of Medusahead, etc. will continue	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Upland Vegetation -- Annual Grasslands				
Perennial grasses increase	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Episodic recruitment of oaks and shrubs	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Upland Vegetation -- Sagebrush Steppe				
Increased perennial grasses ¹	Same as Alt 1 ²	Slower than Alt 1 ³	Faster than Alt 1 ⁴	Increased perennial grasses
Increase in variety of seral stages	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increase in soil cover	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Better distribution of litter and incorporation of litter into soil	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Better root distribution in the soil profile	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased species diversity	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased photosynthetic period	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased vegetative structure	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased frequency of wild fire	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Decreased rate of spread of juniper	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased diversity of age classes in aspen	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
If it is a DPC goal, then shrubs maintained with increased vigor	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
If it is a DPC goal, then shrubs decreased and more perennial grasses and forbs	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Riparian Overview				
Lentic wetlands increase from 27% to 83% in Proper Functioning Condition	Same as Alt 1	Same as Alt 1	Same as Alt 1, but faster	Same as Alt 1
Lotic riparian increase from 28% to 62% in Proper Functioning Condition	Same as Alt 1	Same as Alt 1	Same as Alt 1, but faster	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Riparian -- Vegetation				
Increased shrub and tree layers, with improved age class distribution ⁵	Same as Alt 1 ²	Slower than Alt 1 ³	Faster than Alt 1 ⁴	Increased shrub and tree layers, with improved age class distrib.
Increased cover and vigor of herbaceous perennials	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased streambank cover	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Movement toward later seral stages	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased diversity of plants and animals	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased width of riparian zone	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Decrease of non-riparian species in the riparian zone as water tables rise	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Riparian -- Hydrologic Function and Water Quality				
Improved hydrologic function and water quality ⁶	Same as Alt 1 ²	Slower than Alt 1 ³	Faster than Alt 1 ⁴	Improved hydrologic function and water quality
Stream channels narrow and deepen	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Increased ground water recharge	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Increased flows in perennial streams, and longer seasonal flows in ephemeral streams	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Improved water temperatures	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Improved levels of oxygen	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Reduced nutrients, sediment and pathogens in water	Same as Alt 1	Slower than Alt 1	Faster than Alt 1	Same as Alt 1
Wildlife Habitat				
Wildlife habitats will generally be improved or maintained	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Habitats will develop more diversity	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Increased ground cover in annual grasslands will be good for some species, bad for others	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Improved habitat in oak and shrub areas, tempered by fire occurrence	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Increased fires in annual grasslands may negatively affect shrubs and small tree recruitment	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Sagebrush steppe habitats will change with increased species diversity and vegetative structure	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Increased fire occurrence with increased perennial grasses will result in decrease in pinyon-juniper community. Negative impacts for some birds, but not enough to affect their populations	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Increased fire will result in mosaic of habitat types spread across watershed. More edge will benefit most species	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Improved riparian habitats for waterfowl, shorebirds, migratory birds	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Improved aquatic habitats as more riparian areas reach Proper Functioning Condition	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Upland game habitats slowly improve (riparian component improves faster)	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Slowly improved deer habitat in perennial and annual ranges	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Improved elk habitat	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Improved pronghorn habitat due to increased diversity of plant communities	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Special Status Species				
Positive responses by special status plant species to changes in grazing management	Same as Alt 1	Same as Alt 1	Same as Alt 1, but slightly faster response	Same as Alt 1
Improved habitat for special status animal species	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Wild Horses and Burros				
Potential reductions in herd size as managers determine that wild horse and burro populations are causing an inability to meet rangeland health standards	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Recreation				
General positive effects due to increased ecological function	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Potential restrictions on some recreation activities as managers determine that some recreation activities are causing an inability to meet rangeland health standards	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Wilderness				
Improved naturalness due to improved ecological function (faster occurrence in riparian areas)	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Negative impacts due to increased human manipulation such as new fences, new water developments, more motor vehicle use, etc.	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1
Cultural Resources				
Little effect upon cultural properties	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Potential for increased availability of traditionally used plant species for subsistence, medicinal, and craft purposes	Same as Alt 1	Same as Alt 1	Faster than Alt 1	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Some negative impacts to ranchers' ability to maintain traditional lifestyles	Same as Alt 1	Same as Alt 1	Greater potential for negative impacts	Slightly greater potential for negative impacts than Alt 1
Economics				
Cost to permittees in first 5 years = \$0.6 million, and loss of 6 jobs	Same as Alt 1	Same as Alt 1	Cost to permittees in first 5 years = \$1.3 million, and loss of 12 jobs	Same as Alt 1
Long term costs from AUM reductions, with incremental implementation and gradual improvement of range condition	Same as Alt 1	Same as Alt 1	Faster improvement of range condition, potentially lower long term costs, quicker AUM reinstatement potential	Same as Alt 1
Loss of \$15,811 in grazing fee revenue each of the first 5 years, with some long term costs	Same as Alt 1	Same as Alt 1	Loss of \$34,911 in grazing fee revenue each of the first 5 years, with some long term costs	Same as Alt 1
Loss of \$2,277 to the counties each of the first 5 years	Same as Alt 1	Same as Alt 1	Loss of \$5,027 to counties each of the first 5 years	Same as Alt 1
Lower possessory interest taxes paid by permittees in CA each year (-\$2,339)	Same as Alt 1	Same as Alt 1	Lower possessory interest taxes paid by permittees in CA each year (-\$5,537)	Same as Alt 1

COMPARISON OF IMPACTS				
Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Loss of real estate value due to AUM reductions = \$ 30/AUM	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Increased expense of herding to allotments that require herding (26) = \$3077/allot./yr	Same as Alt 1	Same as Alt 1	Increased expense of herding to allotments that require herding (33) = \$4344/allot./yr	Same as Alt 1
BLM budget = current funding levels	Same as Alt 1	Same as Alt 1	BLM budget = \$1.5 million/yr above current funding levels for 5 years	Same as Alt 1

1. The following changes will occur for all alternatives. It may be a slow process in the uplands, depending upon rainfall, soils, topography, etc. For Alt 1, the changes will occur faster in the Bishop and Redding Resource Areas, and slower in the Susanville area due to the nature of the RAC proposed guidelines for those areas.
2. For Alt 2, rates of change will be the same as Alt 1 due to using essentially the same guidelines.
3. For Alt 3, rates of change will be slower due to a lack of utilization guidelines.
4. For Alt 4, rates of change will be the fastest due to the rapid implementation.
5. The following changes will occur for all alternatives. It will be a faster process than the uplands, due to more water and better soils. For Alt 1, the changes will occur faster in the Bishop and Redding Resource Areas, and slower in the Susanville area due to the nature of the guidelines for those areas.
6. With improvements in vegetation in riparian areas, all functions will improve. Especially, proper functioning riparian zones act like a sponge, holding the water longer, and releasing it slowly throughout the year. The following changes will occur for all alternatives. For Alt 1, the changes will occur faster in the Bishop and Redding Resource Areas, and slower in the Susanville area due to the nature of the guidelines for those areas.

APPENDIX 20 -- DISCUSSION ON UTILIZATION and RESIDUE

Following publication of the draft EIS, there were numerous comments made about whether utilization and residue (stubble height) guidelines should be used to help achieve rangeland health in sagebrush steppe areas. Due to the nature of the comments, BLM did an extensive literature review and analysis of this topic. This appendix discusses the basic issues that were raised during the comment period, and the validity of using utilization and residue as measures to help achieve rangeland health.

I. Background

Comments were received that criticized the inclusion of utilization and residue (stubble height) guidelines in the Standards and Guidelines. Dr. W.A. Laycock, for example, states that utilization and residue limits should be set only at the allotment management plan level and only as a tool to achieve a stated resource objective, not as the objective itself. He does not concur with the utilization table (Table 3.2.5, adapted from Holechek et al. 1995 and Holechek 1991) and states that this table uses research information in an inappropriate manner. He does not agree with Holechek's conclusion that "...in most cases it (50% utilization) causes range destruction in the rugged, arid ranges of the West." Dr. Laycock included 3 recent papers on the use of utilization standards with his comments. These papers (Burkhardt 1997; McKinney 1997; and Sharp et al. 1994) are discussed below. Other commentators agreed with Dr. Laycock, at least in part. For example, the California Cattlemen's Association also referenced the Burkhardt (1997) paper and stated that grazing use levels are not resource attributes and are inappropriate management objectives. They also believe that specific stubble height guidelines must be set on a site-specific basis, and they noted that some sites don't achieve a 4 inch stubble height in an ungrazed state. Mr. Carl Twisselman noted that he has received complaints about the 4-6 inch stubble height guideline for riparian areas, either because grass doesn't usually grow that high or because operators need to graze before that height is reached to prevent weeds from taking over.

On the other hand, several commentators strongly supported the use of utilization and/or residue (stubble height) guidelines in the document. Dr. Jerry Holechek pointed to the overwhelming number of range studies that show soil, watershed, and forage plant health to be closely tied to residues. He believes residues make more sense as standards than any other rangeland characteristic since they are the key element in soil stability, watershed health, and aesthetic appearance. He further stated that the best way to avoid downward trends is to maintain adequate residues and stubble heights. He referenced many research papers that support this view and contradict the assertions of Dr. Laycock. An annotated bibliography of these and other papers on the subject (including those cited by Dr. Laycock) is attached as Appendix C.

Other supporters of utilization and/or residue guidelines include Mr. Roger Peterson, Mr. Jack Booth, the California Department of Fish and Game, and the California Native Plant Society and Natural Resources Defense Council. In a joint letter the latter two organizations noted that utilization limits are essential to proper grazing management and that many studies have shown moderate or light use can result in greater economic returns to the livestock operator than heavy use.

Only one commentor, Dr. Elizabeth L. Painter, took issue with the use of residual dry matter guidelines (RDM) for annual rangelands. Dr. Painter stated that the RDM method was designed for use on private land with alien annual grasslands in order to maximize livestock production. Although this is an important comment that was considered in developing the final EIS, it will not be considered further in this discussion. Rather, this appendix will focus on utilization and residue guidelines in riparian areas and in the sagebrush steppe vegetation type.

II. Summary of Literature

There is a very rich literature on the subject of utilization and residue (stubble height) in managing grazing on rangelands. Some of this literature is summarized here. More information is contained in the annotated bibliography (Appendix C).

A. Recent criticism of utilization and residue levels

Three recent papers have criticized the use of utilization data in management. Sharp et al. (1994) do not believe that using utilization data is an appropriate management tool. They cite difficulties in measuring utilization, variability of utilization levels on bluebunch wheatgrass from 69% to 38% and on crested wheatgrass of 29% to 89% with no apparent harm to the range, and the difficulties in setting proper use levels. (It should be noted that crested wheatgrass is much more resistant to grazing than most native range grasses; because of this, data on its ability to cope with high utilization levels should not be extrapolated to native grasses.) Burkhardt (1997) claims that both utilization and stubble height methods are "likely the least effective management tool," and notes that these were developed to manage season-long grazing; he believes proper season of use and rest are far more effective in dealing with most riparian grazing problems. McKinney (1997) notes the problems associated with measuring utilization when averages are calculated based on plant-by-plant observations. He also maintains that overgrazing does not occur until after the grazing animal makes more than one visit to the plant.

Frost et al. (1994) discuss the difficulties in measuring utilization at times other than the end of the growing season. If utilization is measured before the end of the growing season, the total peak standing crop cannot yet be known; therefore a utilization estimate made at this time by comparing grazed versus ungrazed areas will be an overestimate of true annual utilization. They suggest a new term, relative utilization, for utilization measured in this manner.

B. Older papers that considered utilization as important to range management

Despite these criticisms there is no denying that estimating levels of utilization in order to achieve proper stocking rates has a long history in range management. Early authors investigated the effects of different stocking rates and utilization levels on above-ground biomass, forage production, cover, and other vegetation attributes, as well as livestock performance. Examples are Beetle et al. (1961), Cook (1977), Cooper (1953), Houston and Woodward (1966), Hyder (1951), Johnson (1953), Klipple and Costello (1961), Lang et al. (1956), Launchbaugh (1967), Lewis et al. (1956), Paulsen and Ares (1962), Pearson (1973), Pechanec and Stewart (1949), Pickford and Reid (1948), Skovlin et al. (1976), Smith (1967), Smoliak (1974), Valentine (1970), and Woolfolk (1949). These papers support the views of Holechek (1988 and 1995) on proper utilization levels to maintain and improve forage production and key species. For example, Cook (1977), working in sagebrush-grass range concluded that 25% utilization on key forage plant species was reasonable for late spring and

summer use and that 50% utilization was the maximum use that should occur in the winter. Skovlin et al (1976) found that light stocking (34% for bluebunch wheatgrass and lower for sandberg blue grass) provided a substantial increase in grazing capacity and better cattle gains per head than moderate or heavy stocking. It also provided the highest game density under dual use. Hyder (1951) concluded that on sagebrush-bunchgrass range in southeastern Oregon that "although 50 percent utilization is generally considered to be moderate, it probably represents excessive cropping on the range under consideration because of the large proportion of poor and fair range condition."

C. More recent papers applying utilization and residue to grazing management

There is no dearth of recent studies that consider stocking rate and associated grazing intensity (whether residue levels or utilization) to be important in managing rangeland grazing. Clary (1995) examined vegetation and soil responses to grazing simulation on riparian meadows and found that 10 cm or greater stubble heights appear to be required to ensure full biomass production in mountain meadow sedge communities. He concluded "If utilization guidelines are used, those rates that do not exceed 30% of the annual biomass production will likely maintain production the following year," and that grazing these communities "once annually to a 5-cm stubble height in the spring, or to a 10-cm stubble height in late summer, or at a utilization rate exceeding 30% of the total annual biomass production can reduce herbage production significantly." The recommendations in this paper apply only to maintaining or enhancing production and do not address the issues of streambank stability and channel maintenance. Hall and Bryant (1995) note that cattle preference for forage species will shift as stubble heights drop below 3 inches, at which time they may begin to consume shrubs or coarser, less palatable sedges in wet sites. They recognize three warning signs of impending cattle grazing damage to riparian areas: 1) the stubble height of the most palatable species approaches 3 inches; 2) the stubble height on the most palatable species changes from 3 inches to 3/4 of an inch; and 3) greenness (e.g., crude protein, quality of forage) of the most palatable species diminishes and the species shows signs of drying, thereby indicating a change in forage quality and a consequent change in palatability.

Holechek (1992) found that the most effective management strategy on Chihuahuan Desert rangelands is to use a conservative stocking rate (30-35% use of forage) and that this is a critical factor in the superior vegetation, livestock, and economic performance on the College Ranch as compared to surrounding rangelands. Holechek (1993) summarizes the importance of stocking rate and residues. Holechek et al. (1994) concluded that conservative stocking (about 30% average use) can improve the herbaceous understory even on mesquite-infested range.

Heitschmidt and Walker (1996) argue that aesthetics must be considered in grazing and note that plant species composition does not impact society's acceptance of a given grazing practice nearly as much as things like amount of standing biomass, ground cover, and number of fecal patties. For this reason they argue that moderate rates of stocking must be employed (as opposed to heavier levels at any time) to ensure rangeland agriculture (i.e., grazing) is ecologically sound, economically viable, and socially acceptable.

III. Grazing systems versus season-long or year-long grazing

Burkhardt (1997) stated that utilization guidelines were developed for season-long grazing and are somehow not appropriate if the season of use is controlled, such as would occur through

implementation of a grazing system. Grazing systems have become increasingly popular over the past 40+ years, particularly during the latter half of that time period (Vallentine 1990). Although these systems have been vigorously promoted by some individuals, many studies have shown that stocking rate and intensity of use (utilization) have more to do with successful range improvement than the grazing systems themselves. Vallentine (1990) cites Heady (1974), who concluded that grazing systems have worked only when the grazers have quit overgrazing. Vallentine goes on to say that "It almost appears in some cases that grazing systems have been introduced as substitutes for good livestock and forage management."

A. Stocking rates and utilization levels are more effective tools than grazing systems in improving rangelands

Van Poolen and Lacey (1979) reviewed data from studies previously conducted throughout the West and looked at the increase in herbage production as a result of implementation of grazing systems and of reductions in stocking rate. Utilization levels were defined as follows: heavy=60-80%; moderate=40-60%; light=20-40%. They found that mean annual herbage production increased by 13% when grazing systems were implemented at a moderate stocking rate. Increases were larger (35% and 27%) when continuous livestock use was reduced from heavy to moderate, and moderate to light, respectively. This suggests that land managers should place more emphasis on proper stocking intensity and less on grazing system implementation. Pieper and Heitschmidt (1988) agree, concluding that "stocking rate is and always will be the major factor affecting degradation of rangeland resources."

Hart et al. (1989 and 1993) found that proper stocking rates and grazing intensities were more important than grazing systems in improving rangeland vegetation in Wyoming. Hughes (1990) reported on the experiences of BLM in managing a grazing system of 20 years duration on the Arizona Strip District. On the Beaver Dam Slope Allotment downward trends were recorded between 1970 and 1982 at average utilization levels of 36% (range 10-70%), while this same allotment showed an upward trend between 1981 and 1989 after utilization levels were adjusted to an average of 22% (range 11 to 34%). See the annotated bibliography (Appendix C) for more examples of studies that concluded moderate rates of stocking and utilization are more important than grazing systems in improving rangelands.

B. Grazing systems do not foster range improvement unless attention is paid to stocking rates and utilization

Herbel (1974) reviewed research studies conducted on native rangeland in the 17 contiguous Western States. He found that most grazing studies have been established at fixed stocking rates and that downward adjustments were made only in severe drought. This is one of the reasons many of these grazing studies failed to show much improvement in range condition. This paper shows that stocking rate is likely the overriding factor in determining whether a grazing system works.

Many other authors have looked at the effectiveness in rotational grazing systems as compared to conservative season-long stocking in improving rangeland vegetation. For example, Laycock and Conrad (1981) found that on native sagebrush-grass range in fair to good condition and grazed at a moderate intensity (less than 40% in this study), rest rotation was not a better system than summer-long grazing. Eckert and Spencer (1987) report on a study from 1975 to 1984 on a BLM allotment 48 km south of Winnemucca, Nevada, in Wyoming big sagebrush-Thurber needlegrass, Wyoming big sagebrush-bluebunch wheatgrass, and

Wyoming big sagebrush-Idaho fescue community types. A 3-pasture rest rotation grazing system for grazing May through October was initiated in 1973. This system included periodic heavy use during the growing season, as a result of no reduction in stocking rate. The amount of deferment and rest provided by the 3-pasture system was not sufficient to mitigate the effects of periodic overuse.

C. Rest periods are inadequate to compensate for heavy use at any time of the year

One of the principles behind rest-rotation grazing systems is that the period of rest provided following the impacts of livestock grazing allows for key forage species to recover their vigor. Several authors have investigated this and concluded that for the species examined recovery does not take place for several years if utilization is above conservative levels. For example, Mueggler (1975) clipped Idaho fescue and bluebunch wheatgrass to levels that approximated 50% removal of total herbage weight and studied their response for 5 years (they were protected from grazing during this period). He concluded that recovery of Idaho fescue in moderately low vigor required about 3 years, and bluebunch wheatgrass required a projected 6 years to recover. Thus it is unreasonable to expect these plants to recover with a rest of only 1 or 2 years.

Trlica et al. (1977) defoliated 7 important forage species once to a level of 90% at each of 4 phenological stages. They found that a 2 year recovery period was insufficient for complete recovery of antelope bitterbrush, fourwing saltbush, blue grama (except when defoliation occurred during the dormant season), and fringed sagewort. Western wheatgrass, little rabbitbrush, and scarlet globemallow made good recovery after a single defoliation followed by 14-26 months of rest.

It is often suggested that utilization at periods when plants are dormant has no effect on their vigor. Sauer (1978) showed that standing dead material is beneficial to bluebunch wheatgrass and that the species would be expected to decline in vigor with overuse in the dormant period. Sneva (1980) found that herbage yield of Whitmar wheatgrass was greater when standing dead material was present. Cook (1977) concluded that a maximum utilization of 50% in the winter should be allowed on seven species occurring in the sagebrush-grass vegetation type. Thus, utilization should be kept at conservative levels even in periods of plant dormancy. (Note that this discussion applies only to maintaining plant vigor and does not even address the benefits of maintaining residue for soil protection, infiltration, and wildlife.)

Taylor et al. (1997) looked at the response of vegetation to 4 increasing levels of stocking under a rotational grazing system and long-term rest. After 10 years of study (in Texas) they concluded "For rotational stocking to be successful, we recommend monitoring of grazing use on preferred plants. Range managers must then adjust both grazing methods and animal numbers to maintain proper use on key forage species."

D. Conclusions

The lessons from these and other studies are that stocking rate and utilization are more important than grazing systems in improving rangelands and that attention must be given to maintaining conservative stocking rates and utilization levels at all times during the year. One or even two years' rest cannot be expected to make up for heavy use during one year.

IV. Should utilization levels or stubble heights (residue) be employed in managing rangelands in California?

Despite the importance of utilization in range management many authors have pointed out problems both in measuring it (Jasmer and Holechek 1984, Frost et al. 1994) and in applying it (Jasmer and Holechek 1984, Holechek 1995). With respect to measurement problems, Jasmer and Holechek (1984) give an excellent review of the literature on measuring utilization and the attendant limitations of all of these methods. Jasmer and Holechek summarizes the application difficulties by noting the problem that results from yearly variability of production of biomass: 30 percent use on key plant species in a drought year may result in severe defoliation, while a range receiving the same level of use in a wet year may appear ungrazed. Another problem with utilization levels is that they are not directly related to rangeland health per se.

All of these problems are eliminated or reduced if residue is monitored instead of utilization. Although the two are obviously related (the degree of utilization in any particular year determines the amount of residue left), residue is preferable for three reasons. The first is that it is easier to measure (Jasmer and Holechek 1994), whether residue is expressed in pounds per acre or as a residual stubble height. The second is that grazing intensity data between years and locations are much more comparable (Jasmer and Holechek 1994). The third is that residue is directly related to soil stability and infiltration rates (Thurow et al. 1988), maintenance of plant productivity (Sauer 1978, Sneva 1980, and Cook 1977), and wildlife habitat; all three of these attributes are directly related to rangeland health. An additional benefit is the increased aesthetic quality of the rangeland.

Residue in terms of pounds per acre has been applied to annual rangelands in California for many years. Residue in terms of stubble heights is becoming a well-established guideline in riparian areas as well (Clary 1989 and 1995). Both quantitative and qualitative methods are in place to monitor these types of residue levels. For sagebrush-steppe rangelands, however, guidelines have not been developed that relate proper residue levels to either stubble heights of key perennial grasses, leader lengths of important shrubs, or residue expressed in pounds per acre. As Jasmer and Holechek (1984) point out, however, some literature exists on this subject. They point to the paper by Hyder (1953) that recommends that 160 pounds per acre of residue be left at the end of the grazing season on big sagebrush rangeland in southeastern Oregon. They also suggest that such guidelines could probably be determined from the literature.

V. Decisions

Based on the review of existing information it is clear that it is not only possible but desirable to set Statewide guidelines on proper utilization and residue (stubble height) levels for the two major vegetation types, sagebrush-steppe and riparian vegetation. These guidelines would be used unless and until they are modified by site-specific (e.g., allotment or group of allotments) guidelines. The guidelines should be the same as those recommended under Alternative 4, for both the utilization levels for uplands and the stubble height requirements for riparian area. The literature supporting these levels seems clear.

As Dr. Holechek has pointed out in his comments, however, ranchers tend to resist residue and utilization level approaches because they can result in termination of grazing at times unfavorable to them and cause financial losses if implemented without adequate flexibility. The issue becomes one of striking a balance between rangeland conservation and rancher welfare.

For this reason, we have decided that in addition to adopting the utilization and residue levels of Alternative 4 we will adopt a modified version of the recommendations of Dr. Holechek in implementing these guidelines: Management changes will be implemented (e.g., reductions in livestock numbers or another management change) if utilization and/or stubble guidelines are exceeded more than 2 years out of every 5 years or 2 consecutive years on the average of the key areas across the allotment. In addition, at least 70% of the individual key areas should fall within the maximum utilization or minimum stubble height guidelines in most years. Because of the potential long-term damage associated with severe grazing, we are adding additional caveats to Dr. Holechek's recommendation: that severe grazing use (defined here as >70% utilization in upland perennial grass communities and less than 2 inches stubble in riparian herbaceous communities) in any key area in any year will result in a management change.

Note that Dr. Holechek's recommendations referred to residue or stubble height guidelines on upland as well as riparian sites. Because we have not yet developed residue or stubble height guidelines for upland sagebrush-steppe grassland, we will retain the utilization guidelines in Alternative 4 of the draft EIS but to take steps to develop residue or stubble height guidelines to replace these. This will either be done at the Statewide level or at a more local level -- in either case, however, there will be an environmental analysis and public review prior to implementation.

McKinney (1997) pointed out a problem in averaging utilization measurements taken on individual plants of a key species: the *average* utilization level at a key area may be within acceptable limits when many individual plants are actually too heavily used. He gives the following example from a transect along which utilization on 10 plants of a key species is measured. Four plants are grazed at the severe level (90%), 2 plants at the heavy level (70%), and four plants are ungrazed (0%). The average (also called the mean) of these values is 50% utilization, even though 6 plants (60% of the plants sampled) were grazed at a level exceeding 50% use, and 4 of these were grazed severely. This problem can be overcome by using the *median* instead of the mean utilization (the median is that value that has an equal number of observations on either side, after the observations have been placed in order from smallest to largest). In McKinney's example, the median utilization would be 70%, giving a much more accurate picture of the true situation. The same principle also applies to stubble heights. Although we considered switching from use of the mean to the median utilization and stubble height, we decided against this approach for two reasons: 1) studies upon which utilization and stubble height guidelines are based used means; and 2) existing monitoring information is based on means. We intend, however, to investigate this issue further. Since the mean and median can be calculated from the same data set, we will calculate both statistics from each data set collected and compare these to see how often the situation described by McKinney actually occurs. Following several years of comparison, we may decide to base management decisions on median utilization and stubble height, rather than using the mean.

APPENDIX 21 -- IMPLEMENTATION PLAN

Purpose: Section 43 of the Code of Federal Regulations, Part 4180 (43 CFR 4180) requires the Bureau of Land Management (BLM) to develop and implement standards and guidelines to meet the fundamentals of rangeland health. The following is a description of the processes to be used in determining implementation priorities for determining and initiating appropriate management actions.

Procedure: In order to assess whether the allotments are meeting the fallback standards (43 CFR 4180.2(f)(1)), BLM has made, based on existing information, an initial determination of which grazing allotments are not meeting one or more of the fallback standards and whether this is the result of current grazing practices. An assumption has been made by the BLM field managers that, with few possible exceptions, the implementation needed for the regulatory fallback standards and guidelines will essentially be the same as for any anticipated set of final approved standards and guidelines developed for the State. Therefore the recent screening process determinations used for identifying how and where to implement the fallback standards and guidelines will be used as the proposed plan for implementing the standards and guidelines developed and adopted for use specifically in California.

For the initial screening process, a review was made, for all grazing allotments, of existing monitoring information such as grazing utilization records, range condition and trend studies, soil and water resource assessments and inventories, riparian proper functioning condition (PFC) assessments, photographs, wildlife habitat information, vegetation studies, etc. Resource management specialists familiar with the on-the-ground situation, in conjunction with the above mentioned information, then recommended priorities for implementation or identified needs for further assessments. Each allotment was placed into one of four categories as follows:

- Category 1: Areas where one or more standards are not being met, or significant progress is not being made toward meeting the standards(s), and livestock grazing is a significant contributor to the problem.
- Category 2: Areas where all standards are being met, or significant progress is being made toward meeting the standard(s).
- Category 3: Areas where the status for one or more standards is not known, or the cause of the failure to not meet the standard(s) is not known.
- Category 4: Allotments where one or more of the standards are not being met or significant progress is not being made toward meeting the standards by causes other than (or in addition to) livestock grazing activities. (Those allotments where current livestock grazing is also a cause for not meeting the standards are included in Category 1 in addition to this category.) The authorized officer should take appropriate action based on regulation or policy; however, these actions not related to livestock grazing are outside the scope of this implementation plan and will not be addressed in this document.

CATEGORY 1 ALLOTMENTS

Recently the field offices identified, based on existing information, the allotments that they thought contained areas not meeting the fallback standards, as identified in the regulations. The following table lists the allotments in this category. For these allotments where the standards are not being met, management actions will be implemented to correct the situation prior to the next grazing season turn-out period for the allotment.

Each field manager will determine the priorities for initiating needed management changes for Category 1 allotments based on ecosystem position, resource risk, biological values, legal requirements, and social/economic considerations. Grazing permittees/lessees, interested publics (per 43 CFR 4100 definition),¹ and other appropriate agencies will be provided opportunities to review resource conditions and monitoring information, participate in the evaluation of the information, and provide recommendations for management remedies. The BLM will meet NEPA process requirements for any proposed changes in management. Final determinations of the needed management remedies will be reflected as terms and conditions to the permit or lease either developed through agreement with all interested parties or, if necessary, through the issuance of full force and effect decisions.² Resource Advisory Councils and other affected interests will be consulted in the development, revision, or termination of allotment management plans or equivalent planning that is also involved in making these determinations. Again, changes in management to make significant progress towards meeting the standards must be initiated by the start of the next grazing season.

For those allotments where existing data is insufficient to assess all standards or all areas of an allotment, a rangeland health assessment will be conducted and documented, verifying why the standard(s) is not met. This will be an on-the-ground qualitative assessment (PFC for riparian areas and Qualitative Procedure to Assess Rangeland Health for Uplands; see Appendix 25) as needed for each of these allotments, to further verify rangeland health conditions. This information may cause further adjustments in determinations and/or management actions.

Monitoring will be conducted to evaluate the progress towards improving rangeland health and to evaluate the success of the specific management measures applied.

¹ Interested public means an individual, group or organization that has submitted a written request to the authorized officer to be provided an opportunity to be involved in the decision-making process for the management of livestock grazing on specific grazing allotments or has submitted written comments to the authorized officer regarding the management of livestock grazing on a specific allotment. (43 CFR 4100.0-5)

² In most situations where an agreement is not achievable or cannot be made timely, a proposed decision would be issued (this proposed decision is protestable), and then a final decision developed. (Provisions are available for requesting a stay of a final decision.)

TABLE 1 -- CATEGORY 1 ALLOTMENTS		
Allotment Name	Field Office	Standard(s) Not Met^a
Goldpan Canyon	Caliente	Riparian, WQ
North Fork River	Caliente	Habitat, Riparian, WQ
Studhorse Canyon	Caliente	Riparian
Chico Martinez	Caliente	Habitat
Western Min. RD.	Caliente	Habitat
Maricopa	Caliente	Habitat
Canebrake	Caliente	Riparian
Case Mountain	Caliente	Riparian, WQ
Freedom Hill	Caliente	Soils, Riparian
Short Canyon	Caliente	Habitat
Washburn Ranch	Caliente	Riparian
Loco Bill Canyon	Caliente	Soils, Habitat, Riparian
Sand Canyon	Caliente	Riparian
Loraine	Caliente	Riparian, WQ
Walker Pass West	Caliente	Riparian
Spanish Needle	Caliente	Riparian
Oak Grove	Caliente	Riparian, WQ
Aurora Canyon	Bishop	Riparian, WQ, Habitat
Bodie Mountain	Bishop	Soils, Riparian, WQ
Potato Peak	Bishop	Riparian
Hot Creek	Bishop	WQ, Habitat
Wilfred Creek	Bishop	Habitat
Wells Meadow	Bishop	Habitat
Travertine Hills	Bishop	Riparian, WQ
Sawmill Creek	Bishop	Riparian, WQ
Laws	Bishop	Riparian, WQ
Bigelow	Folsom	Habitat
Appling Estate	Folsom	Riparian, Habitat

TABLE 1 -- CATEGORY 1 ALLOTMENTS		
Allotment Name	Field Office	Standard(s) Not Met^a
Rapini	Folsom	Riparian, Habitat
Gorham Ranch	Hollister	Soils
Silver Creek	Hollister	Soils
Gates	Hollister	Habitat
Upper Los Gatos Cr	Hollister	Habitat
Diamond A	Hollister	Habitat
Kreyanhagen	Hollister	Habitat
Salt Creek	Clear Lake	Habitat
Dutch Gulch	Redding	Habitat
McDonald Mountain	Alturas	Habitat
South McDonald	Alturas	Habitat
West Beaver Creek	Alturas	Riparian
South Horse Lake	Eagle Lake	Riparian, Habitat
Observation	Eagle Lake	Riparian
North Fort Sage	Eagle Lake	Riparian
Tablelands	Eagle Lake	Soils, Riparian, Habitat (Medusahead)
Spanish Springs AMP	Eagle Lake	Habitat
Rowland	Eagle Lake	Habitat, Soils
Shaffer	Eagle Lake	Riparian
Twin Peaks	Eagle Lake	Soils, Riparian, Habitat
Chilcoot	Eagle Lake	Habitat, Soils
North Horse Lake	Eagle Lake	Riparian
Deep Cut	Eagle Lake	Soils, Riparian, Habitat
Pitchfork	Eagle Lake	Habitat, Soils
Slate Creek	Eagle Lake	Riparian
Cottonwood	Eagle Lake	Riparian
Nevada Cowhead	Surprise	Habitat, Riparian
Sand Creek	Surprise	Riparian

TABLE 1 -- CATEGORY 1 ALLOTMENTS		
Allotment Name	Field Office	Standard(s) Not Met ^a
Selic-Alaska	Surprise	Riparian, Habitat
Tuledad	Surprise	Riparian, Habitat
Wall Canyon West	Surprise	Riparian, Habitat

^a These standards are based on the primary indicator topics for rangeland health: soils (including soil erosion), riparian and wetlands function, water quality, and habitat (including healthy plant communities and healthy animal habitats).

CATEGORY 2 ALLOTMENTS

Based on monitoring information a number of allotments meet all the standards or are making significant progress towards meeting the standards to sustain rangeland health. Periodic monitoring will reveal if the standards are continuing to be met or are making significant progress towards being met. If not, this determination will trigger further rangeland health assessments and evaluation for the areas of concern. (See the monitoring section for further information on monitoring techniques and practices.) The following table identifies the allotments currently within this category.

TABLE 2 - CATEGORY 2 ALLOTMENTS

Field Office	Allotment Names		
Caliente	Painted Rock Saucito Ranch Phelan Temblor Creek Buena Vista Creek Sulphur Canyon Santa Barbara Cyn. Round Mt. Road Packwood-Fran. Kelso Peak Nellie's Nipple Havilah Basin Washburn Cove Power Line Road Scodie Meadow Kennedy Lamont Badger Creek Rancheria Creek Horn Mountain Rankin Ranch Sacatar Meadows Eagle Nest Peak Dry Creek Johns Peak	KLC Temblor-Caliente Oilfield Road North Temblor Frazer Valley Derby Acres Thompson Ridge Santiago Creek Bluestone Ridge Airport Cyrus Canyon Waggy Flat Cienaga Canyon Devils Gulch Bald Eagle Peak Cuyama 2 Santa Rita West Klipstein Rio Bravo Mountain Creek Cooks Peak Progress Gulch Milk Ranch Peak East Klipstein	Goodwin Ranch Carrizo Ranch Naval Pet. Res. 1 Oil Field Bear Valley Selby Ranch Willow Spring Cyn. Santa Teresa Chimineas Ranch Smith Canyon Cholla Canyon Burnt Point Surp. Arroyo Red Mountain Long Valley Freeborn Mnt. McKittrick Smt. Hubbard Hill Chimney Rock Liveoak Canyon Bodfish McVan Oil Field Paso Robles Rancheria
Bishop	Volcanic Tablelands Owens Valley Com. Shannon-Baker Ck. Marble Creek Black Lake Tinemaha Symons Ash Creek Tobacco Flat West Santa Rita Lone Tree West Reservoir Rancheria Gulch Aristo Ranch Mono Sand Flat Walters Ranch Casa Diablo	Zurich West Crater Mnt. Black Mine Mathieu Chalfant Valley Granite Mountain Bramlette Chalk Bluff Alabama Hills Aberdeen Mono Lake Copper Mountain Dry Canyon Slinkard Valley Potato Peak E. Crater Mountain George Creek	Owens Valley Little Round Valley Hammil Valley Adobe Valley Poleta Canyon Adobe Lake Jeffery Long Valley Red Mountain Poverty Hills Mono Mills Dog Creek Koenig Ranch Little Mormon Green Creek Blind Springs Mount Biedeman

TABLE 2 - CATEGORY 2 ALLOTMENTS

Field Office	Allotment Names		
Hollister	Birdwell Ortiz Estate Mercy White House Butts Estate Perry Diaz Frusetta Ranch Chular Willow Spring Roth Taylor Boynton Laguna Creek Cievo Hills Folks Bucks & Cedar Rail Cattle Dosados Panoche Hills Wolfenberger Hernandez South Chalone Boekenooogan Mine Creek	Jack Harris Juniper Ridge Los Banos Akers Echo Canyon Aurignac Lewis Flat Frusetta Bee Canyon Rena Creek Schmidt Walker Peak Cole Gravelly Flat DePavo Westphal Indian Valley Ortitalita Jacalitos Ranch Squire Adobe East Little Panoche Alcade Mine Canyon	Lasgoity Zwang Cal-West Burnett Brothers La Gloria Pine Rock Freeman Romero Ranch Draghi Alcade Canyon Thomason Ardans Molina Canyon Castle Mountain Little Panoche Lamacchia Quarter Circle Joaquin Rocks Moreno Gulch Williamson Bar-B Goat Mountain Mueller Grassy Canyon
Arcata	Strawberry Rock Spanish Flat Big Butte	Windy Point Pepper Gap Lake Mountain	HJ Ridge Willis Ridge Jewett Creek
Clear Lake	Salt Lick Canyon Perkins Creek 5615 Ritcher Lease	Cement Creek Perkins Creek 5602 Green Valley	Jericho Valley Scotts Valley
Redding	Messner/Limekiln L&L Cattle C. R1 Paynes Creek Henke Clear Ck. Pasture Paynes Ck/Sac. R. Lemos Furtado Salt Springs Bullskin	Inks Creek Costa Fuglistaler Novy Graves Big Bluff Tuscan Rickert Hornbrook Hitchings	Flock Digger Creek Gray Orwick #1 Table Mountain Liston Battle Creek Kerns Long Ranch

TABLE 2 - CATEGORY 2 ALLOTMENTS

Field Office	Allotment Names		
Alturas	Tule Mountain Pine Creek Mesa South Graves Portuguese Flat Crowder Much River Silva Flat Rocky Prairie Moon Spring Mahogany Mnt. Coyote Ridge Big Tablelands West Field Corbie Field Cutoff Christopher Brunnemer Russell Porter Reservoir Indian Peak Bend Daisey Dean Crabtree Deep Canyon Clarks Valley Peterson Ranch Cinder Pit Mt. Hebron Starvation Gulch W. Mahogany	North Tablelands East Field N. Graves/McKey Strip Dixie Valley Cold Springs Said Valley Six Mile Hill Hogback ridge Rimrock S. Red Rock Lake Bloody Point Fitzhugh Field Dervin Field Flourney Individual Cloud Perry Sterns Loomis North Juniper Plantation Cramer Coffin Warm Springs West Coyote Cayton Crystal Lake Four Corners West Dome Cayuse Mountain	South Tablelands Mithcell Hill Wside Bailey/Dorris Russel Slough Bald Mnt./River Nelson Corral Dry Cow Archgate N. Red Rock Lake Ryegrass Swale Modoc Gulch Windmill Pine Creek Field West Fitzhugh Stevens Roberts Creek Prock Browns Field South Juniper Babcock Dixon Hill Marr Hall Field Wing Day Popcorn Cave Contad Saddle Mountain Lava Flow
Eagle Lake	E. Bald Mountain Shinn Peak Spanish Spgs. Ind. N. Bailey Creek Wood Snowstorm Willow Creek Dellera Ind. McPherrin Walton Hansen Coffin	Barron Twin Buttes Buffam/Met. Ravendale Buck's Bay Walsh Mountain Round Valley Ramelli Mello Canyon Said Valley Stone Bonta	S. Fort Sage Winter Range Williams Erick Crest Rice Canyon Willow Ck. Grade Steffan Alpers Dry Valley Humphrey

TABLE 2 - CATEGORY 2 ALLOTMENTS			
Field Office	Allotment Names		
Surprise	Alkali Lake	Bicondoa	Bitner
	Bull Creek	Calcutta	Corral
	Crooks Lake	East	Little Basin
	Long Valley	Lower Lake	Massacre Lakes
	Massacre Mtn.	Mosquito Valley	North Larkspur
	Nut Mountain	South Larkspur	West
	12 Mile	Latirogoyen	North Cowhead

CATEGORY 3 ALLOTMENTS

A determination has not yet been made of the rangeland health condition for these allotments and whether they meet all the standards for rangeland health. This is either due to insufficient information or an indication by the field manager that further assessment of the cause is needed in order to finalize a determination. Rangeland health assessments are planned to be completed for all allotments within the next five years. The initial scheduling for the assessments will be made using the BLM I,M,C priority management system. Where concerns have been brought to BLM's attention that a rangeland health problem may exist on a particular allotment, then those areas will be of highest priority for assessment.

A qualitative procedure will be used to determine rangeland health conditions, using the established Proper Functioning Condition Technique (TR 1737-9 and 11) for riparian/wetland areas and the Qualitative Procedure to Assess Rangeland Health for Uplands (Appendix 25). This latter technique has been tested in some areas, but may need further modification and refinement after trying it in California's diverse environments. Additionally, some of the current procedures may have to be adapted in situations where relict or pristine areas are not readily available for comparing information. Further refinement may also be needed to adequately assess rangeland health conditions for the annual grassland vegetative type. These techniques may also be applicable for any re-assessments or refined assessments for those allotments currently identified in the other categories.

The following table identifies those allotments needing further assessment, which will be completed within the next five years.

TABLE 3 - CATEGORY 3 ALLOTMENTS

Field Office	Allotment Name		
Caliente	Catskin Cottonwood Drainage Bitterwater Valley Red Hill Curtis Mountain Fay Canyon S. Comb Rocks	Blossom Peak Live Oak Pass Mankins Creek Raven Pass Cedar Canyon Lynch Canyon Bitter Ck. Drg.	Pleito Elephant Back N. Comb Rocks South Mountain San Emigdio Sulphur Ridge
Folsom	Thomason Gardella Hope Burgess Tait Ford Banks Van Allen Dragmanovich Hendley Bacchi Ranch Stembridge Millhouse Boys Rnch White Dunlap, A. Del Orto Porteous Campbell Wooster Haigh Santo Domingo Ranch	Meyer Gorgas Visher Turpin Toppins Newton & Sons Bordenave Crook Solari Williams Bacchi Valley Thompson Morales Oneto Dunlap, C. Cuneo, E. Sanders Dutil Sardella Filberti	Landes Giusto Griffith Ortiz Fehr Ritts Fraguero Gann Rabon Valley Munn Whittle Robinson Reed Oneto Partnership Hertlein Ranch Cuneo, M. Himan Chatom O'Day Engler
Hollister	Fort Ord Ashurt Ranch		
Clear Lake	Maxwell Creek Ladoga	Apple Tree Feliz Creek	Rocky Ridge Eams Lease
Redding	Aldridge Meissner	Hathaway J. Taylor	Hayden
Eagle Lake	West Fort Sage Satuca Harrison	Jacks Valley Evans Magee	Ulch Dotta

TABLE 3 - CATEGORY 3 ALLOTMENTS			
Field Office	Allotment Name		
Alturas	Highway Kelly Stevens XL Hughes Clark Haury Majors North Dibble Radio Hill Round Valley Monchamp Butte Creek Roberts Individual Avery Hencraft Summit W. Bloody Point North Sheepy Barntop Hagge	Bacon Blacks Canyon Stull Gardner Thoms Creek Eicholz Hitchens Knudson Harper Hill Reclamation Howell Canyon Meyers Piper Pilot Butte Lower Highway Brockman West Sheep Mtn. Bryant Mountain Lower Lake South Sheepy	Fisher SX Hastings Lakeshore Chase Valley Turner Canyon Hayes Canyon Dibble Hill Barber Canyon South Barber Mamath Barrows Roberts Reservoir Big Valley Mtn. Fillman-Diablo Dry Valley Rattlesnake Butte Loveness West Panhandle Red Rock Valley
Surprise	Bare Denio Bally Mountain East Bally Granger Horse Lake Scammon Upper Sand Creek Red Rock Lake	Board Corral Duck Lake Bidwell Fandango Gravelly McCulley South Bidwell Warner Valley Wall Canyon East	Boggs Homecamp Buck Mountain Goose Creek Highway Ninemile Upper Lake Nevada Coleman

CATEGORY 4 ALLOTMENTS

This category includes allotments in which one or more of the standards are not met due to causes other than (or in addition to) current livestock grazing activities. In some instances the cause may be land use type activities other than grazing, such as mining, road construction, forest practices, recreation vehicle use, etc., or to natural causes such as infestation of noxious weeds, unnatural invasions of less desirable vegetation due to wildfire (or lack thereof) or unusual flood events. Where grazing is also a cause for not meeting a standard(s) in any one of these allotments, it is included in Category 1 in addition to this category.

An attempt has been made to identify these causes so that future management actions may be considered. Causes related to natural phenomena such as geomorphologic influences to water quality or establishment of natural vegetative communities following fires (such as chaparral establishment in the Mediterranean bioregion) have not been included.

The following table lists the allotments in this category and, where known, identifies the probable causes for not meeting standards.

TABLE 4 -- CATEGORY 4 ALLOTMENTS			
Field Office	Allotment Name	Standard(s) Not Met	Cause
Caliente	Kettleman Hills	Habitat	Fire
	N. Naval Pet. Res.	Habitat	Fire
	Old Arroyo	Habitat	Fire
	Arroyo Hondo	Habitat	Fire
	Goldpan Canyon	Riparian, WQ	Roads
	North Fork River	Habitat, Riparian, WQ	Recreation*
	Lorraine	Riparian, WQ	Roads
Bishop	Laws	Soil, Habitat	Water Diversion*
	Wells Meadow	Soil, Riparian, WQ	Deer Use*
	Mormon Ranch	Soil, Riparian, Habitat	Road
Arcata	Travis Ranch	Habitat	Weeds
	Horse Pasture Ridge (unalloted)	Habitat	Weeds
Clear Lake	Salt Creek	Habitat	Weeds*
Redding	McKay	Soils, Habitat	Wild Horses
	Krusp	Riparian	Mining
	Coonrod	Habitat	Weeds
Alturas	North Ash Valley	Habitat	Fire**
	South Ash Valley	Habitat	Fire**
	South Fork	Habitat	Fire**
	Thompson	Habitat	Fire**
Eagle Lake	Observation	Riparian, Habitat	Wild Horses*
	Tablelands	Soils, Riparian, WQ, Habitat	Weeds*
	Twin Peaks	Soils, Riparian, Habitat	Wild Horses,*
	Deep Cut	Soils, Riparian, Habitat	Weeds* Weeds*
Surprise	Tuledad	Riparian, Habitat	Wild Horses* Fire**
	Red Rock Lake	Habitat	Wild Horses*

* Livestock grazing is also a causal influence.

** Undesirable vegetation invasion is attributed to excessive wildfire prevention or fire suppression.

APPLICATION OF GUIDELINES

Once the guidelines are approved by the Secretary of the Interior, they will be applicable to the management of livestock grazing on all allotments not meeting the health standards; some guidelines will be applicable regardless of the specific rangeland health condition. Many of the guidelines are designed to help protect and sustain rangeland health and are not intended to be applied only to remedy problems. Many of the guidelines will need to be more specifically identified and then applied as terms and conditions of a permit or lease, based upon the specific needs for meeting rangeland health standards. There will also be instances where specific terms and conditions to grazing use authorizations will be applied for reasons other than those directly related to rangeland health, such as to accommodate other resource needs and land uses or to meet administrative requirements. Examples of this may include protecting cultural resource sites, requiring a specific breed of livestock to be used that is compatible with the needs of other permittees or lessees using the same allotment, or for meeting various regulatory requirements for grazing administration purposes. In some instances, existing terms and conditions will be carried over from previously made plans and commitments, such as those identified in allotment management plans or coordinated management plans. In these instances, the applications may or may not be related to rangeland health needs.

The preferred alternative contains utilization, residue, and stubble height guidelines that apply to all allotments that do not meet the standards and are not making significant progress toward meeting the standards (and for which lower utilization levels or higher levels of stubble or residue would be expected to help move these allotments toward the standards). These guidelines will apply unless and until Field Offices develop site-specific utilization, residue, and stubble height guidelines. Until the standards are achieved or significant progress toward meeting the standards is being made, site-specific guidelines can be more but not less restrictive than those in these guidelines. Determination of whether the statewide guidelines or site-specific guidelines are most appropriate will be made prior to the start of the next grazing season following the approval of these standards and guidelines.

In developing the guidelines, much attention has been given to prescriptions relative to maximum grazing use levels. While these parameters are needed and are effective in restoring and sustaining rangeland health, other measures as portrayed in the guidelines must also be considered and implemented where and when appropriate. Often a combination of different measures will be necessary for effective results.

Any terms or conditions specified for a permit or lease, must be consistent with and support appropriate BLM land use plans or other land use plans applicable to the public lands (such as the Northwest Forest Plan and PacFish). BLM will also adhere to requirements such as those identified as terms or conditions from a biological opinion for protecting the habitat of a plant or animal under the Endangered Species Act.

Terms and conditions will be applied to grazing permits, leases, or other grazing authorizations as the authorized officer (field manager) determines the need. The determination of what terms and conditions will be applied will be made in consultation with the respective permittees/lessees and other interested parties involved in the particular allotment. The same process will be used for making needed changes to any existing terms and conditions. Information from assessments and evaluations of monitoring data will be used to determine the management changes needed. Alternative management changes will be

considered and evaluated through the NEPA process prior to making final determinations. It is anticipated that in most instances, the terms and conditions will be identified cooperatively and be agreed upon by the affected permittee/lessee and all interested parties. Where an agreement cannot be reached, then a formal decision (which is appealable) will be issued.

MAINTENANCE OF LAND USE PLANS

The Record of Decision for this EIS will amend the land use plans identified in Appendix 4, as well as allotment management and other activity level plans, to include the standards and guidelines adopted through the EIS process. The standards and guidelines will become effective immediately upon approval by the Secretary of the Interior and will be incorporated into the Plans at that time. Where there are plan decisions that are contrary to the new regulations, the principles of rangeland health and the standards and guidelines, those decisions will be deleted from the plans or amended to comply.

Each Field Office will make the physical changes to their land use plans prior to next grazing season. As this is merely plan maintenance, further NEPA analysis will not be necessary to complete this administrative action.

REPORTING PROGRESS IN RANGELAND HEALTH ACHIEVEMENTS

Rangeland health conditions will be reported annually for each grazing allotment. This information will include the determinations of rangeland health conditions through assessments and monitoring and the progress made towards meeting rangeland health standards. Specifically, for each allotment an identification will be made of what standards, if any, are not met or where significant progress is not being made toward meeting the standard; the magnitude of the standard not being met, such as acres, miles of stream, number of sites, etc.; what progress has been made regarding determining and implementing needed management changes; and the results of making the management changes as determined from monitoring information. Additionally, any changes in the management categories of the allotments will be identified and an explanation of the reasons for the change will be made.

The above information will be gathered at the field office which administers the respective allotment(s). A summary of this information will be consolidated for all of the allotments within the EIS area and made available to the public annually.

Throughout all processes the public is encouraged to participate in the identification of rangeland health conditions, developing management remedies, monitoring results and reviewing progress towards achieving rangeland health standards.

BLM FIELD OFFICES

There are currently 10 Field Offices located within the EIS area. The Field Managers within these offices are responsible for implementing the rangeland health standards and applying the guidelines for livestock grazing to the grazing allotments within their area of jurisdiction. Specific information regarding the administration and management of any grazing allotment is

recorded and available for review at the respective Field Office. The following is a list of Field Offices with the most current address and phone numbers:

Alturas Field Office
708 W. 12th Street
Alturas, California 96101
(530) 233-4666

Eagle Lake Field Office
2950 Riverside Drive
Susanville, California 96130
(530) 257-0456

Arcata Field Office
1695 Heindon Road
Arcata, California 95521-4573
(707) 825-2300

Folsom Field Office
63 Natoma Drive
Folsom, California 95630
(916) 985-4474

Bakersfield Field Office
3801 Pegasus Avenue
Bakersfield, California 93308
(805) 391-6000

Hollister Field Office
20 Hamilton Court
Hollister, California 95023
(408) 630-5000

Bishop Field Office
785 North Main St., Suite E
Bishop, California 93514
(760) 872-4881

Redding Field Office
355 Hemstead Drive
Redding, California 96002
(530) 224-2100

Clear Lake Field Office
2550 N. State Street
Ukiah, California 95842
(707) 468-4000

Surprise Field Office
P.O. Box 460
602 Cressler Street
Ceaderville, California 96104
(530) 279-6101

APPENDIX 22--ASSESSMENT AND MONITORING

Assessment to Determine if Allotments are Meeting Standards

"Assessment" means the analysis, synthesis, and interpretation of information, including monitoring data, to characterize the health of an allotment or other management unit. Gathering new information in the field may be necessary as part of the assessment process. "Monitoring" means the periodic gathering of information.

In some cases, quantitative monitoring data, gathered over a period of years, may be essential to determine whether an area meets the standards and whether livestock grazing is a significant factor contributing to a failure to meet the standards. However, quantitative monitoring data is not always required to make these determinations nor to implement actions to improve grazing management. The preamble to the 1995 grazing regulations (BLM 1995b) states that managers may "use a variety of information, including monitoring records, assessments, and knowledge of the locale." The 1995 regulations also require the manager to "reduce permitted grazing use or otherwise modify management practices"..."when monitoring or field observations show grazing use or patterns of use are not consistent with the provisions of 43 CFR subpart 4180" (43 CFR 4110.3-2(b); subpart 4180 includes the standards and guidelines). Changes in permitted use are to be "...supported by monitoring, field observation, ecological site inventory, or other data acceptable to the authorized officer." Therefore, actions needed to improve grazing management in order to comply with guidelines or meet standards should not be delayed solely because monitoring data are lacking. Rangelands will not be allowed to deteriorate while prolonged monitoring studies are conducted, when reliable indicators of rangeland health demonstrate a need for corrective action.

Assessments should employ the minimum information needed to determine whether the standards are being met and whether livestock grazing is a significant factor in failing to meet the standards. All resource information or data collected should be tied directly to the standards, guidelines, or resource objectives.

Resource Areas will conduct assessments of all allotments according to the priority described in Appendix 21. These assessments will be done using an interdisciplinary approach, and the findings and reasons for the findings will be documented. The format and content of this documentation will be left up to individual Field Managers, but the form used by the Eagle Lake Field Office (Appendix 24) is one example of the type of documentation that could be employed.

The term "assessment," when used by itself, has the meaning described above; that is, it considers all available information, whether from inventory, monitoring, or qualitative assessments. "Qualitative assessment" refers to a particular method used to rapidly assess whether allotments or areas within allotments are meeting standards. The Proper Functioning Condition (PFC) procedure is the qualitative assessment method that is applied to riparian/wetland areas (BLM 1994 and 1995a). The Qualitative Procedure to Assess Rangeland Health (Appendix 25) is the qualitative method that will be applied to upland rangelands. The use of these procedures, and their relationship to monitoring, will be discussed in more detail below.

Application of Traditional Rangeland Monitoring to Assessing Whether Standards are Being Met

Many rangeland monitoring studies have been in place and read on a regular basis by BLM personnel in California for many years. These studies involve using qualitative or quantitative procedures, or both, and often are directed at determining the condition and trend of key species in key areas. The basic types of studies, as well as the use of the key species and key area approach, are described in Chapter 3, Section 3.2.5, of the FEIS. The purpose of these studies has primarily been to determine if management objectives relative to particular grazing allotments are being met or if the trend is toward meeting these objectives. For example, a management objective might be to increase the frequency of a key species such as squirreltail (*Elymus elymoides* ssp. *elymoides*) by 10% in Pasture A of Allotment Z in 5 years. Some method of frequency monitoring is then set up in one or more key areas in Pasture A and read on a regular basis (this could be annually but might be once every five years; in this example the frequency of monitoring would have to be at least every five years). In another example, the objective might be to increase the basal cover of the key species bluebunch wheatgrass (*Pseudoregneria spicata* ssp. *spicata*) in Pasture B of Allotment X by 5 percent over the next 6 years. A method of monitoring that measures cover is then set up in one or more key areas of Pasture B and read on a regular basis (this could be annually or on some other schedule, but must be at least every 6 years).

Management objectives have not always been directed at key species. Objectives to increase the total vegetation cover on particular pastures or allotments have also been applied, as well as objectives to decrease the cover of shrubs or trees. In both of these examples, monitoring methods are chosen that measure or estimate cover. These methods might be quantitative in nature or qualitative; the latter might involve taking photographs, either on the ground or aerially.

A second monitoring objective of traditional rangeland monitoring has been to determine the "condition and trend" of rangelands. The condition is determined by comparing the current species composition and production of a given ecological site to the species composition and production of the potential natural community of that site (see Chapter 3, Section 3.3.3 for a more complete description of the process). Trend is recorded as upward, downward, or static, based on whether species composition and production are moving toward, away, or not at all, respectively, from the potential natural community. Ecological site inventory (ESI) is used to determine condition at any one point in time. A second ESI can then be used to determine trend; other monitoring studies, however, can also be used for this purpose, if they yield information on species composition.

Although much of the monitoring currently being conducted will have applicability to determining the effectiveness of implementation of the rangeland standards, some old methods will have to be modified and new methods introduced. This is because the standards require monitoring of certain rangeland attributes that are not assessed under current methodology.

Table A.22.1 is a list of rangeland attributes that may be assessed in order to determine whether standards are being met under the preferred alternative (Alternative 5).

Table A.22.1. List of rangeland attributes that may be assessed in order to determine whether standards are being met under the preferred alternative (Alternative 5), along with the actual wording of the indicator(s) to which each attribute applies (parentheses following each indicator show which Resource Advisory Council and standard it applies to: BAK = Bakersfield; SUS = Susanville; UKI = Ukiah). Several indicators include more than one attribute and therefore are listed more than once, under each of the appropriate attributes.

1. Ground cover
 - a. "Vegetation and other types of ground cover such as rock" (BAK, Soils)
 - b. "Spatial distribution and cover of plant species and their habitats allows for reproduction and recovery from localized catastrophic events" (BAK, Species)
 - c. "Vegetation cover is greater than 80% or the percentage that will protect banks and dissipate energy during high flows" (BAK, Riparian)
 - d. "There is minimal cover of invader/shallow-rooted species" (BAK, Riparian)
 - e. "Point bars are vegetated" (BAK, Riparian)
 - f. "Point bars are becoming vegetated over time (UKI, Riparian)
 - g. "Ground cover (vegetation and other types of ground cover such as rock) sufficient to protect sites from accelerated erosion" (UKI, Soils)
 - h. "Naturally occurring vegetation cover will protect banks and dissipate energy during high flows" (UKI, Riparian)
 - i. "Adequate stream bank stability, pool frequency, stream width depth ratio, and minimal substrate sediments and bare ground" (UKI, Riparian)
 - j. Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species" (SUS, Streams)
 - k. "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events" (SUS, Streams)
2. Litter/residual dry matter
 - a. "Litter/residual dry matter is evident, in sufficient amounts to protect the soil surface" (BAK, Soils)
 - b. "Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients" (BAK, Species)
 - c. "Adequate organic matter (litter and standing dead plant material) is present to protect the site and to replenish soil nutrients through decomposition" (BAK, Riparian; UKI, Riparian)
 - d. "Litter/residual dry matter evident, accumulating in place, and showing negligible movement by water" (UKI, Soils)
 - e. "Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and support nutrient cycling" (UKI, Species)
 - f. "Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and maintain soil health" (SUS, Biodiversity)

Table A.22.1 (cont'd)

3. Plant species diversity

- a. "A diversity of plant species, with a variety of root depths, is present and plants are vigorous during the growing season" (BAK, Soils)
- b. "A diversity of plant species with various phenological stages and rooting depths are present on sites where appropriate" (BAK, Species)
- c. "Where appropriate, species composition contributes to the desired plant community objectives" (BAK, Species)
- d. "A diversity of plant species with various phenological stages and rooting depths are present." (BAK, Riparian)
- e. "Plant species present indicate that soil moisture characteristics are being maintained" (BAK, Riparian; UKI, Riparian)
- f. "A diversity of plant species, including native plants, with a variety of root depths, is present and plants are vigorous during the growing season" (UKI, Soils)
- g. "A diversity of plant species with various developmental stages and rooting depths are present to extend the photosynthetic period and increase energy capture" (UKI, Species)
- h. "Species composition contributes to the desired plant community objectives" (UKI, Species)
- i. "A diversity of plant species with various developmental stages and rooting depths is present" (UKI, Riparian)
- j. "Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site" (SUS, Upland Soils)
- k. "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events" (SUS, Streams)
- l. "Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines." (SUS, Riparian and Wetland)
- m. "Riparian vegetation and large woody debris are well anchored and capable of withstanding high stream flow events" (SUS, Riparian and Wetland)

4. Plant vigor

- a. "A diversity of plant species, with a variety of root depths, is present and plants are vigorous during the growing season" (BAK, Soils)
- b. "Plant vigor is adequate to maintain desirable plants and ensure reproduction and recruitment of plants when favorable climatic events occur" (BAK, Species; UKI Species)
- c. "A diversity of plant species, including native plants, with a variety of root depths, is present and plants are vigorous during the growing season" (UKI, Soils)

Table A.22.1 (cont'd)

- d. "Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site" (SUS, Upland Soils)
 - e. "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events" (SUS, Streams)
 - f. "Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines." (SUS, Riparian and Wetland)
 - g. "Vigor is adequate to maintain desirable levels of plant and animal species to ensure reproduction and recruitment of plants and animals when favorable events occur." (SUS, Biodiversity)
5. Soil crusts
- a. "Biological (microphytic or cryptogamic) soil crusts are in place where appropriate" (BAK, Soils)
 - b. "Where appropriate, biological soil crusts (also called microphytic or cryptogamic soil crusts) are present and not excessively fragmented" (BAK, Species; UKI, Species)
 - c. "Biological (microphytic or cryptogamic) soil crusts, if present, are intact" (UKI, Soils)
6. Plant structure
- a. "A variety of age classes are present for most perennial plant species" (BAK, Species)
 - b. "Age-class and structure of woody/riparian vegetation is diverse and appropriate for the site" (BAK, Riparian)
 - c. "A variety of age classes are present for desired plant species" (UKI, Species)
 - d. "Age-class and structure of woody/riparian vegetation is diverse and appropriate for the site. Recruitment of preferred species is adequate for sustaining the community" (UKI, Riparian)
 - e. "Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site" (SUS, Upland Soils)
 - f. Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species" (SUS, Streams)
 - g. "Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines." (SUS, Riparian and Wetland)
 - h. "Age class and structure of woody riparian and wetland vegetation are appropriate for the site" (SUS, Riparian and Wetland)
 - i. "A variety of age classes are present for most species" (SUS, Biodiversity)

Table A.22.1 (cont'd)

7. Spatial distribution of plants and their habitats (also animals in UKI)
 - a. "Spatial distribution and cover of plant species and their habitats allows for reproduction and recovery from localized catastrophic events" (BAK, Species)
 - b. "The spatial distribution of plant and animal species and their habitats allows for reproduction and recovery from localized catastrophic events" (UKI, Species)
 - c. "Distribution of plant species and their habitats allow for reproduction and recovery from localized catastrophic events" (SUS, Biodiversity)
8. Natural disturbances
 - a. "Appropriate natural disturbances are evident." (BAK, Species)
 - b. "Evidence of beneficial natural disturbances" (UKI, Species)
 - c. "Natural disturbances such as fire are evident, but not catastrophic" (SUS, Biodiversity)
9. Non-native plants and animals, including noxious and invasive species
 - a. "Levels of non-native plants and animals are at acceptable levels" (BAK, Species)
 - b. "Noxious and invasive species are contained at appropriate levels" (BAK, Species)
 - c. "Non-native, noxious, and invasive species are at acceptable levels" (UKI, Species)
 - d. "Shallow-rooted, invader plant species are not displacing native species" (UKI, Riparian)
 - e. "Non-native plant and animal species are present at acceptable levels" (SUS, Biodiversity)
10. Special status species
 - a. "Special status species are healthy and in numbers that appear to ensure stable to increasing populations; habitat areas are large enough to support viable populations or are connected adequately with other similar habitat areas" (BAK, Species)
 - b. "Special status species and other local species of concern are healthy and in numbers that appear to ensure stable to increasing populations; habitat areas are large enough to support viable populations or are connected adequately with other similar habitat areas" (UKI, Species)
 - c. "Habitat areas are sufficient to support viable populations and are connected adequately with other similar habitat areas." (SUS, Biodiversity)
 - d. "Healthy, productive and diverse populations of native plant and animal species, including special status species, are maintained (SUS, Biodiversity)

Table A.22.1 (cont'd)

11. Tree and shrub canopy cover
 - a. "Where appropriate, shading is sufficient to provide adequate thermal regulation for fish and other riparian dependent species" (BAK, Riparian)
 - b. "The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter" (SUS, Streams)
12. Woody debris
 - a. "Where appropriate, there is adequate woody debris" (BAK, Riparian; UKI, Riparian)
 - b. "Riparian vegetation and large woody debris are well anchored and capable of withstanding high stream flow events" (SUS, Riparian and Wetland)
13. Root masses
 - a. "Root masses are sufficient to stabilize stream banks and shorelines" (BAK, Riparian; UKI, Riparian)
14. Streambank stability
 - a. "Streambank stability, pool frequency, substrate sediments, stream width, and bank angles are appropriate for the stream type (using Rosgen's Streambank Classification System)" (BAK, Riparian)
 - b. "Adequate stream bank stability, pool frequency, stream width depth ratio, and minimal substrate sediments and bare ground" (UKI, Riparian)
 - c. "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events" (SUS, Streams)
 - d. "Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines." (SUS, Riparian and Wetland)
15. Pool frequency
 - a. "Streambank stability, pool frequency, substrate sediments, stream width, and bank angles are appropriate for the stream type (using Rosgen's Streambank Classification System)" (BAK, Riparian)
 - b. "Adequate stream bank stability, pool frequency, stream width depth ratio, and minimal substrate sediments and bare ground" (UKI, Riparian)
16. Substrate sediments
 - a. "Streambank stability, pool frequency, substrate sediments, stream width, and bank angles are appropriate for the stream type (using Rosgen's Streambank Classification System)" (BAK, Riparian)

Table A.22.1 (cont'd)

	b.	"Adequate stream bank stability, pool frequency, stream width depth ratio, and minimal substrate sediments and bare ground" (UKI, Riparian)
17.	Stream width/depth	
	a.	"Streambank stability, pool frequency, substrate sediments, stream width, and bank angles are appropriate for the stream type (using Rosgen's Streambank Classification System)" (BAK, Riparian)
	b.	"Adequate stream bank stability, pool frequency, stream width depth ratio, and minimal substrate sediments and bare ground" (UKI, Riparian)
18.	Bank angles	
		"Streambank stability, pool frequency, substrate sediments, stream width, and bank angles are appropriate for the stream type (using Rosgen's Streambank Classification System)" (BAK, Riparian)
19.	Chemical constituents of water	
		"The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen" (BAK, Water Quality; UKI, Water Quality; SUS, Water Quality)
20.	Water temperature	
		"The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen" (BAK, Water Quality; UKI, Water Quality; SUS, Water Quality)
21.	Nutrient loading	
		"The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen" (BAK, Water Quality; UKI, Water Quality; SUS, Water Quality)
22.	Fecal coliform	
		"The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen" (BAK, Water Quality; UKI, Water Quality; SUS, Water Quality)

Table A.22.1 (cont'd)

23. Turbidity
"The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen" (BAK, Water Quality; UKI, Water Quality; SUS, Water Quality)
24. Suspended sediment
"The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen" (BAK, Water Quality; UKI, Water Quality; SUS, Water Quality)
25. Dissolved oxygen
"The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen" (BAK, Water Quality; UKI, Water Quality; SUS, Water Quality)
26. Aquatic and riparian organisms
 - a. "Aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants) indicate support for beneficial uses" (BAK, UKI, and SUS, Water Quality)
 - b. "Where appropriate, habitat is sufficient to provide for plant and animal riparian dependent species. There is diversity and abundance of insects and amphibians." (UKI, Riparian)
27. Soil erosion
 - a. "There is minimal evidence of accelerated erosion in the form of rills, gullies, pedestaling of plants or rocks, flow patterns, physical soil crusts/surface sealing, or compaction layers below the soil surface" (BAK, UKI, Soils)
 - b. "Evidence of wind and water erosion, such as rills and gullies, pedestaling, scour or sheet erosion, deposition of dunes is either absent or if present does not exceed what is natural for the site" (SUS, Upland Soils)
 - c. "Negligible accelerated erosion as a result of human activities is present" (SUS, Riparian and Wetland)
28. Degree of floodplain flooding
"Portions of the primary floodplain are frequently flooded (inundated every 1-5 years)" (SUS, Streams)

Monitoring of Vegetation and Physical Attributes

Vegetation monitoring (including soil crusts). Table A.22.2 lists the trend monitoring methods currently in use or described in the Interagency Technical Reference, Sampling Vegetation Attributes (BLM et al. 1996a) and the plant and vegetation attributes they measure. Of the list of attributes in Table A.22.1, the following can be monitored using a combination of these methods:

- Ground cover
- Litter/residual dry matter
- Plant species diversity
- Plant vigor
- Soil crusts
- Plant structure
- Spatial distribution of plants and their habitats
- Natural disturbances (although not specifically identified by a column heading on Table 22.2, these can be tracked under the heading "spatial distribution")
- Non-native plants (these can be monitored by measuring or estimating density, frequency, or cover)
- Special status plants (these can be monitored by measuring or estimating density, frequency, or cover)
- Tree and shrub canopy cover

Note, however, that in some cases these attributes are not measured or estimated as part of the standard procedure. For example, the typical way in which the Daubenmire method (which estimates canopy cover in either 6 or 10 categories in a series of plots) is used yields measurements of the cover of bare ground, vegetation, litter, gravel/rock, as well as frequency and species composition. Other attributes, such as the cover of biological, physical, and chemical crusts, cryptogams, production, and vigor *can* be incorporated into the standard procedure with proper planning.

Monitoring of Guidelines Associated with Utilization, Residue, and Stubble Heights. For the reasons given in Section 3.2.5, it is important to set and monitor guidelines on utilization levels, minimum residues, and minimum stubble heights. Guidelines have been set for the entire EIS area where standards are not being met; site-specific guidelines will be set by Field Offices. Existing monitoring of utilization, residue, and stubble heights will continue, and new studies will be established as needed. On upland perennial rangelands not meeting the standards, utilization will be measured on key species in key areas, with the average (mean) utilization used to assess whether the portion of the allotment or pasture represented by the key area is meeting the utilization guideline (there are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make this determination after examining the data over a period of a few years). We recognize that residue, in terms of stubble height and litter, is a better measure of utilization in upland perennial grass communities than percent utilization, but we do not have sufficient information at this time to develop guidelines that use these attributes. We intend to investigate this matter further, however, as time and funding permit, and to eventually replace the utilization guidelines on perennial uplands (which specify percent of key species removed) with guidelines specifying

TABLE A.22.2. MONITORING AND ASSESSMENT OF UPLAND SOIL AND VEGETATION STANDARDS AND INDICATORS

Applicable Direct Methodologies (Adapted from a table prepared by Kris Eshelman, BLM Nevada State Office)

Attributes Method	Soil		Surface Crusts			Ground Cover					Vegetation									
	Compaction	Infiltration	Biological	Physical	Chemical	Bare Ground	Vegetation	Litter	Cryptogam	Gravel/Rock	Cover			Density	Frequency	Production	Structure	Composition/ Diversity	Spatial Distribution	Vigor/Repro- duction
3x3' Photo Plot			O	O	O	O	M	M	O	O			M	M				M		O
5x5' Photo Plot			O	O	O	O	M	M	O	O			M	M				M		O
Daubenmire 6/10 Class			O	O	O	M	M	M	O	M	M				M	O		M		O
Line Intercept			O	O	O	O	O	O	O	O			M					M		O
Quadrat Frequency			O	O	O	O	O	O	O	O	O	O	O		M	O				I/O
Nested Frequency			O	O	O	O	O	O	O	O	O	O	O		M	O				I/O
Pace Frequency			O	O	O	O	O	O	O	O	O	O	O		M	O				I/O
Density Hoop/Frame														M				M		I/O
Pace Point			O	O	O	M	M	M	O/M	M	O/M	O/M	M				L/M	M		I/O
Point Frame			O	O	O	M	M	M	M	M	O/M	O/M	M					M		I/O
Double Sample/Weight Estimate															O/L	M,E		M		I/O
Harvest															O/L	M		M		I/O
Comparative Yield																M				I/O
Dry-Weight Rank																		M		I/O
Rangeland Health	E	E	E	E	E	E	E	E	E	E	E						E	E		I
Photos-Oblique	I	I	I	I	I	I	I	I	I	I						I	I	I		I
Satellite-Landsat						L	L				L/M							L/I	L/M	
High Altitude Photo						L	L				L/I							L/I	I	
Low Altitude Photo			I	I	I	I	E	I	I		I	I		L,M			L/I	L/I	I	I
Robel Pole																	L/M			
Soil Surface Factor (SSF)	E	E				E		E												
Cover Board																	M			
Soil Survey	M	E,M		M	M															
ESI-Vegetation																M		M	M	

M = Measured: Attribute measured as part of the standard procedures.

E = Estimated: Attribute estimated as part of the standard procedures.

O = Optional: Attribute may be incorporated into the standard procedure, with proper planning.

I = Interpreted: Attribute values may be interpreted by professional judgement.

L = Limited: Procedure is limited in scope, capability, or accuracy.

TABLE A.22.2 (CONT'D). MONITORING AND ASSESSMENT OF UPLAND SOIL AND VEGETATION STANDARDS AND INDICATORS
Applicable Direct Methodologies (Adapted from a table prepared by Kris Eshelman, BLM Nevada State Office)

Method	Reference	Comments
3x3' Photo Plot	SVA	Limited statistical reliability because of limited numbers of plots.
5x5' Photo Plot	SVA	Limited statistical reliability because of limited numbers of plots.
Daubenmire 6/10 Class	SVA	Estimation of cover for soil surface attributes and surface crusting may be included.
Line Intercept	SVA	Estimation of cover for soil surface attributes and surface crusting may be included. Very time-consuming if used for herbaceous plants.
Quadrat Frequency	SVA	Point data can be taken at the tips of the quadrats. Point data can include Surface Crust, Soil Surface, Age and Form Class. Quadrats may be nested to add capability.
Nested Frequency	SVA	Point data can be taken at the tips of the nested quadrats. Point data can include Surface Crust, Soil Surface, Age and Form Class.
Pace Frequency	SVA	Point data can be taken at the tips of the quadrats. Point data can include Surface Crust, Soil Surface, Age and Form Class. Quadrats may be nested to add capability.
Density Hoop/Frame		Density can be a valuable attribute for certain special status plants. Qualitative techniques can also be used to estimate numbers within classes (see Section 3.2.5)
Pace Point	SVA	Modifications can be made to include nearest plant and canopy occurrence by lifeform.
Point Frame	SVA	Time consuming.
Double Sample/ Weight Estimate	SVA	Method that estimates annual production (which is the entire above-ground biomass in herbaceous communities) by estimating weight in many quadrats while actually harvesting vegetation in a few.
Harvest	SVA	Requires harvesting (clipping and weighing) annual production in all quadrats. Very time consuming.
Comparative Yield	SVA	A newer method involving a type of double sampling. This method used alone gives total annual production. It is often used in conjunction with dry-weight-rank to obtain species composition by weight.
Dry-Weight Rank	SVA	Used in conjunction with the comparative yield method to obtain species composition by weight.
Rangeland Health	In Draft	A qualitative assessment method that addresses major ecological factors using an interdisciplinary team.
Photos-Oblique	SVA	Most useful for presentation and evidential testimony. Especially helpful if you have a time series.
Satellite-Landsat		Spatial information derived from pixel information. Can be used to measure surface area. Requires considerable ground truthing.
High Altitude Photo	TR 1734-1	Can be used to interpret spatial and sometimes quantitative aspects of rangeland communities.
Low Altitude Photo	TR 1734-1	Can be used to interpret spatial and sometimes quantitative aspects of rangeland communities.
Robel Pole	SVA	Visual obstruction method used mostly for bird surveys. Gives some limited structural (height) information.
Soil Surface Factor	TR 4400-5	Historical BLM watershed method most useful for comparing similar watersheds.
Cover Board	SVA	Method that estimates vertical cover from vertically placed frames. Most effective in riparian or other dense vegetation sites.
Soil Survey		Standard NRCS and BLM procedures.
ESI-Vegetation	H-4400-1	See Double Sample/Weight Estimate.

SVA = *Sampling Vegetation Attributes*, Cooperative Extension Service, U.S. Forest Service, Natural Resource Conservation Service, Bureau of Land Management.

TR 4400-5 = *Rangeland Monitoring, Supplemental Studies*, Technical Reference 4400-5, Bureau of Land Management, 1992.

TR 1734-1 = *Guidelines for the Use of Aerial Photography in Monitoring*, Technical Reference 1734-1, U.S. Bureau of Land Management, 1991.

minimum amounts of residue to be left. A very preliminary study proposal is given in Table A.22.3.

Table A.22.3. Preliminary Study Proposal: Developing Residue and Stubble Height Guidelines for Major Vegetation Types in the Great Basin

Objective: Develop upland residue and stubble height guidelines for the major vegetation types in the Great Basin

- Conduct a literature review.

This review would look at material published in peer-reviewed publications and "gray" literature as well as information collected by field offices. In addition, range scientists at universities and in other agencies (e.g., NRCS, ARS, Forest Service) would be interviewed.

- Conduct the following study.

A study would be conducted to fill in the gaps in information that are expected to exist following the literature review. Over a period of several years the residue left following known levels of utilization will be measured at several sites in different vegetation types. This will entail measuring total above ground production in ungrazed areas (using either cages or exclosures), measuring utilization after the grazing season on key species, and measuring the amount of standing and fallen dead plant material (separately) at that level of use. The stubble heights of key species will also be measured, both in grazed and ungrazed condition. Photographs will be taken both of the key species and the landscape, both in grazed and ungrazed areas. As much as possible, sites should be selected that are close to existing weather stations (NOAA, RAWS stations, etc.) so the total production can be related to the amount of precipitation received.

The study should be conducted over several years in order to show a range of residue, stubble heights, and utilization levels as related to different amounts of precipitation. This study should enable field personnel to develop either State or regional guidelines on the appropriate residue and stubble height levels that should be left following grazing.

Following is a list of the utilization and residue studies from the Interagency Technical Reference, *Utilization Studies and Residual Measurements* (BLM et al. 1996b) that may be applied to public lands within the EIS area:

Browse Utilization Methods:

- Twig Length Measurement Method
- Cole Browse Method
- Extensive Browse Method

Residue Measuring Methods

- Stubble Height Method

- Visual Obstruction Method
- Comparative Yield Method

Herbaceous Utilization Methods

- Paired Plot Method
- Ocular Estimate
- Key Species Method
- Height-Weight Method
- Actual Weight Method
- Grazed-Class Method
- Landscape Appearance Method

Exact methods to be used to monitor utilization, residue, and stubble heights will be determined by the Field Offices.

The above utilization and residue monitoring studies are usually applied to key areas (see glossary for a definition of key area and the discussion of key areas in Chapter 3, Section 3.2.5). Utilization pattern mapping is another important monitoring tool. This method entails canvassing the entire allotment or individual pasture and mapping the area into several classes based on the level of utilization (e.g., no use, light use, moderate use, and heavy use) on key species (see Chapter 3, Section 3.2.5 for more information). These studies will continue where necessary.

Actual use monitoring. Actual use studies (BLM 1984) are another form of traditional range monitoring that will continue. These studies track the actual use made by livestock in pastures and/or allotments based on the numbers of livestock and the length of time livestock are present. These numbers are usually provided by lessees/permittees but are sometimes also estimated from counts by BLM professionals. The actual use made by other herbivores such as wild horses and burros and wildlife is often estimated as well. These data are important in determining what changes should be made when objectives and standards are not being met.

Climate monitoring. It is important to consider climate when interpreting monitoring data. Climate monitoring most often consists of compiling precipitation and temperature information collected by the National Oceanic and Atmospheric Administration at the many weather stations in the EIS area. In some cases, precipitation data are collected through the placement of rain gauges in allotments. Additionally, both temperature and precipitation data are collected from 14 Remote Automated Weather Stations (RAWS) within the EIS area.

Riparian-wetland monitoring. The vegetation attributes of riparian-wetland areas are monitored using one or more of the techniques described in Table A.22.2. The Greenline Riparian-Wetland Monitoring Method (BLM 1993) is also used by some field offices. The following physical attributes are also monitored on some riparian-wetland areas:

- Bankfull discharge
- Sinuosity
- Riparian zone width

- Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody debris)
- Width/depth ratio

Use of Qualitative Assessments to Determine if Standards are Being Met

As noted above, traditional range monitoring studies can help assess whether standards are being met. The standards, however, call for the assessment of indicators that are not addressed by these traditional monitoring studies. Where the status of these indicators cannot be inferred from existing monitoring information, other monitoring or assessment methods must be employed. The following qualitative assessment procedures were developed to rapidly assess all the physical and biological components of rangeland health.

Qualitative Upland Assessment. For uplands, the qualitative assessment method will be used. Although a technical reference has not yet been finalized on the method, a draft has been prepared and field tested. The details are given in Appendix 25. Field Offices may adapt this method as necessary to meet local needs. The results of the qualitative assessment will be used in conjunction with all other available information to determine if an allotment is meeting the standards. If it is not, and does not appear to be making significant progress toward meeting the standards, and grazing has been determined to be a significant factor, changes will be made to the management of livestock grazing. To assess whether these management changes are effective in moving toward meeting the standards, monitoring will be initiated (or, if already being conducted, will be continued) that is directed toward those indicators that are responsible for the allotment not meeting the standards. For example, if the qualitative assessment indicates that insufficient litter is present, subsequent monitoring will focus on measuring the amount of litter (either the cover of litter or the amount in weight of litter).

Qualitative Riparian/Wetland Assessment. A qualitative procedure, called proper function condition (PFC) assessment (see Appendix 23), is already in place to help assess whether riparian and wetland areas are meeting the standards (BLM 1994 and 1995a). This PFC assessment has already been applied to many riparian/wetland areas within the EIS area. Its use will be continued. Just as with the upland qualitative assessment procedure, when the PFC implicates one or more indicators as being responsible for an allotment not meeting the standards, subsequent monitoring will focus on those indicators. For example, if the width/depth ratio is the main reason a stream is determined to be not meeting the standard of proper functioning condition, subsequent monitoring would focus on the width/depth ratio of the stream.

Wildlife Monitoring for Rangeland Health

Each of the Bakersfield, Ukiah, and Susanville standards for rangeland health include a "species" or "biodiversity" standard. Each also includes several indicators of animal habitats and populations that are attributes of a healthy rangeland ecosystem. These indicators can be divided into those related to habitat, and those related to animal populations. The habitat indicators include habitat seral stages, vegetation structure and patch size, spatial distribution of habitats, habitat size, how habitats are connected, and the habitat's ability to support viable populations. The animal population indicators include the spatial distribution of animals,

special status species numbers, stable to increasing populations, viable populations, and levels of non-native animals.

The BLM recognizes that determining the biodiversity health for each allotment is an impossible task involving the gathering of species-specific data at many locations and scales. However, a more achievable option is to design monitoring programs that evaluate ecosystem components, structures and processes as indicators of a habitat's *capability* to support healthy animal communities. We would then rely on focused studies to more directly monitor species of management concern.

There are different scales of monitoring and management to evaluate the relationships between habitat management from livestock grazing and animal populations. It is critical to evaluate the assumptions that habitat management at the allotment (or pasture) level will actually affect animal presence and abundance at the monitoring site(s). It is necessary to determine the appropriate scale of monitoring: coarse scale regional monitoring of several allotments for some animal community indicators; fine scale monitoring at the allotment level for some special status, game animals, and keystone species; and site-specific scale for some special status species and ecosystem health indicators that are restricted to very small habitat areas. Monitoring plans should consider these issues of scale when designing allotment monitoring programs.

Habitat mapping and vegetation monitoring would usually suffice to evaluate whether the allotments are providing *adequate opportunities* for wildlife communities in meeting the standards. Spot checking for selected species at the appropriate habitats over several allotments would evaluate rangeland health for many species. At a finer scale of analysis, population censuses at the allotment scale may be needed to determine if the standards are being met. This finer scale monitoring would be directed at special status animals or at species with a very restricted habitat requirement as a rangeland health indicator.

Most allotment monitoring will evaluate the habitat capability for species of management concern. Vegetation characteristics of habitat structure (for example, ground cover, vertical layering, form of trees and shrubs), plant composition, age structure of plants (young, reproducing, old, or decadent trees or shrubs), plant vigor, and the distribution of plant communities across the landscape will be the focus of BLM's monitoring.

Field assessments should emphasize the use of habitat quality checklists to identify significant problems at the appropriate scale (allotment or landscape levels). These checklists can be designed to evaluate habitat quality for a particular species, group of species, or general animal community composition. The elements of such a checklist are given in Table A.22.4. More focused studies or monitoring protocols may be developed where habitat monitoring indicates standards are not being met and where management priority is high.

The BLM will consider existing information on soils, habitats, scientific literature, historic records, fire history, and disturbance regimes to assess habitat capability. When more detailed information regarding a particular species is required, wildlife information systems and species records may be used to conduct assessments of habitat quality for animals of management concern. The California Wildlife Habitat Relationships System (CWHR) and Habitat Evaluation

Procedures (HEP) models may be used for these assessments. These models are based on the assumptions that through habitat assessments, habitat capability (quality) for a particular species or group of species can be determined. The California Natural Diversity Data Base will be used to help assess the significance of BLM actions on special status animal species and rare plant communities.

The rangeland health indicators for animal (wildlife) populations cannot be assessed separately for each species. Evaluating animal numbers and distributions for each species would require an extensive amount of monitoring of hundreds of animal species, a task far beyond the capability of the BLM and our State and private management partners. Instead, monitoring must be focused on a subset of animal "indicator" species that represent wildlife community and populations in general as indicators of ecosystem health. While this method of monitoring has been criticized as flawed since each species has its own niche in the ecosystem that cannot be represented by another species, this approach gives the BLM the opportunity to focus wildlife monitoring within our capability. The indicator species may be threatened or endangered, game animals, species of regional or special concern, keystone species, abundant, or rare. The selection of the indicator species will depend on the allotment management objectives, land use plan objectives, and/or BLM commitments to regional plans. The monitoring of the indicator species may include general distribution or abundance surveys or more focused research to better evaluate the relationships between the animals and their habitats and grazing effects. In many cases, data collection may not be required within each allotment, but across the landscape in habitats with similar characteristics.

Table A.22.4. Elements of a Biodiversity and Species Checklist for Wildlife.

Habitats

CWHR Habitats and seral stage(es) present:

Habitat composition and seral stages related to management objectives:

- Seral stages meet management objectives
- Plant community composition indicates good rangeland health
- Native species present at acceptable levels
- Non-native species at acceptable levels
- Invasive weeds at acceptable levels

Habitat structure related to management objectives:

- Plant cover is adequate, within natural range
- Plant height adequate: herbaceous shrub trees
- Plant density is adequate
- Plants distributed normally
- Ground cover is within normal range
- Age-class indicates community maintenance

Table A.22.4 (cont'd)

Form-class indicates normal growth characteristics

Distribution of Habitats across landscape:

Patch size is adequate

Fragmentation is not excessive

Habitats are connected within site capability

Species

Management indicators selected:

Habitats meet requirements of indicator species:

Elements are considered acceptable:

Elements lacking:

Key management areas present:

Listed species habitats

Riparian

Wetlands

Seasonal ranges (winter, migratory, calving/fawning, etc)

Breeding/nesting sites

Focused Studies

Focused studies in progress:

Focused studies needed:

Evaluation:

Habitats are meeting management objectives

Habitats promote diverse and viable wildlife populations

Seral stages present

Composition

Structure

Distribution

Habitats can withstand catastrophic events (flood/fire/windstorm)

Table A.22.4 (cont'd)

Species present indicate healthy ecosystem function

Habitats meeting species/diversity standards

Habitats not meeting species/diversity standards

Livestock grazing/management is (is not) significant factor

Management changes needed to meet standards

Water Quality Assessment and Monitoring

Most often, when riparian areas and wetlands are healthy, the quality of water for most beneficial uses meet standards. Many of the attributes assessed and monitored for riparian and wetland areas also affect the quality of the water, at least indirectly. There are exceptions, however, where this may not always be true, particularly with regards to the chemistry and physical properties of the water. Biological assessments and monitoring of aquatic organisms in water bodies serve to identify important attributes reflecting the quality of water for many beneficial uses and will be used when it is determined necessary where the quality of the water may be in question.

In most situations BLM will depend upon the State and Regional water quality agencies to either identify, or assist BLM in identifying, where water quality is impaired or has a high probability of being impaired. For those areas where livestock grazing activities on public land are known to cause or are suspected of causing water quality impairment, BLM will closely coordinate with these agencies in obtaining any needed water quality monitoring and assessment information. Where sufficient information is not available, BLM will also closely coordinate with these agencies in the selection and design of the attributes to be assessed and monitored by BLM. Since the states have primary responsibility and primacy regarding the Clean Water Act and the Safe Drinking Water Act, it is important that any water quality assessment or monitoring information obtained by BLM meet the acceptance of those state agencies responsible for identifying the specific requirements of those Acts.

Effectiveness Monitoring of Guidelines

Effectiveness monitoring is used to evaluate whether a particular activity, when carried out as planned, results in the desired effect (MacDonald et al. 1991). In the context of rangeland standards and guidelines effectiveness monitoring will be used to evaluate whether guidelines, if followed, result in either meeting or making progress toward meeting the standards. This type of monitoring will be employed when the other types of monitoring and assessment discussed in this appendix determine that progress is not being made toward meeting standards despite compliance with guidelines. For example, a grazing system is implemented in order to move an

allotment toward meeting standards, but after five years of monitoring no progress is detected. The management system will then be evaluated to determine why it is not producing the desired effects and changed accordingly. Utilization and stubble height guidelines provide another example. If, after several years of compliance with these guidelines, allotments are not moving toward meeting standards, these guidelines will be evaluated and supplanted by new ones as appropriate.

Application of New Technology to Monitor and Assess Rangeland Health

Traditional transect based techniques for measuring vegetation and other indicators of rangeland health provide detailed information at a plot level. Care must be used when using plot-based measurements to characterize large areas because of problems in extrapolating information from small samples to large areas. Methods for assessing rangeland health at multiple scales are currently in their infancy. The use of remotely-sensed data, primarily satellite imagery, will hopefully become a rapid and inexpensive method for measuring rangeland health on larger areas.

One pilot effort recently initiated in the northeastern portion of the EIS area is a cooperative project between BLM, the National Resource Conservation Service, and the Forest Service's Pacific Northwest Experiment Station. It involves the transitioning from traditional Soil Surveys to Resource Surveys, which are multi-resource, map-based surveys of soil, vegetation, water, and wildlife characteristics. Part of the project will include development of a set of tools that will be designed to assess rangeland health at multiple scales and areal extent.

As new methodologies such as this one are developed, they will be applied to monitoring and assessing rangeland health standards within the EIS area.

Monitoring and Assessment Plans

Each Field Office will develop a plan that will direct its monitoring and assessment activities relative to making determinations on whether standards are being met, whether progress is being made toward meeting the standards if they are not currently being met, and whether livestock grazing is the reason for standards not being met. These plans need not be elaborate, but at a minimum they will include a list of the attributes that will be monitored, the monitoring methods that will be used (with reference to a complete description of the method), the allotments that will be monitored using these methods, the frequency at which the allotments will be monitored, and how often interdisciplinary assessments will be made of all the information collected (including monitoring data, qualitative assessment information, inventory data, etc.). A monitoring and assessment schedule will also be included. These monitoring and assessment plans will be made available to all interested parties.

APPENDIX 23: DISCUSSION OF PFC

PFC -- PROPER FUNCTIONING CONDITION WHAT IT IS - WHAT IT ISN'T

PFC is: A methodology for assessing the physical functioning of riparian and wetland areas. The term PFC is used to describe both the **assessment** process, and a defined, on-the-ground **condition** of a riparian-wetland area. In either case, PFC defines a minimum or starting point.

The PFC **assessment** provides a consistent approach for assessing the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes. The PFC assessment synthesizes information that is foundational to determining the overall health of a riparian-wetland area.

The on-the-ground **condition** termed PFC refers to *how well* the physical processes are functioning. PFC is a state of resiliency that will allow a riparian-wetland system to hold together during a 25 to 30 year flow event, sustaining that system's ability to produce values related to both physical and biological attributes.

PFC isn't: The sole methodology for assessing the health of the aquatic or terrestrial components of a riparian-wetland area.

PFC isn't: A replacement for inventory or monitoring protocols designed to yield information on the "biology" of the plants and animals dependent on the riparian-wetland area.

PFC can: Provide information on whether a riparian-wetland area is physically functioning in a manner which will allow the maintenance or recovery of desired values, e.g., fish habitat, neotropical birds, or forage, over time.

PFC isn't: Desired (future) condition. It is a prerequisite to achieving desired condition.

PFC can't: Provide more than strong clues as to the actual condition of habitat for plants and animals. Generally a riparian-wetland area in a physically non-functioning condition will not provide quality habitat conditions. A riparian-wetland area that has recovered to a *proper functioning condition* would either be providing quality habitat conditions, or would be moving in that direction if recovery is allowed to continue. A riparian-wetland area that is functioning-at-risk would likely lose any habitat that exists in a 25 to 30 year flow event.

Therefore: To obtain a complete picture of riparian-wetland area health, including the biological side, one must have information on *both* physical status, provided through the PFC assessment, and biological habitat quality. Neither will provide a complete picture when analyzed in isolation. In most cases proper

functioning condition will be a prerequisite to achieving and maintaining habitat quality.

PFC is: A useful tool for prioritizing restoration activities. By concentrating on the "at risk" systems, restoration activities can save many riparian-wetland areas from degrading to a non functioning condition. Once a system is non functional the effort, cost, and time required for recovery is dramatically increased. Restoration of non functional systems should be reserved for those situations where the riparian-wetland has reached a point where recovery *is possible*, when efforts are not at *the expense* of "at risk" systems, or when unique opportunities exist. At the same time, systems that are properly functioning are not the highest priorities for restoration. Management of these systems should be continued to maintain PFC and further recovery towards desired condition.

PFC is: A useful tool for determining appropriate timing and design of riparian-wetland restoration projects (including structural and management changes). It can identify situations where instream structures are either entirely inappropriate or premature.

PFC is: A useful tool that can be used in watershed analysis. While the methodology and resultant data is "reach based", the ratings can be aggregated and analyzed at the watershed scale. PFC, along with other watershed and habitat condition information helps provide a good picture of watershed health and the possible causal factors affecting watershed health. Use of PFC will help to identify watershed scale problems and suggest management remedies and priorities.

PFC isn't: Watershed analysis in and of itself, or a replacement for watershed analysis.

PFC is: A useful tool for designing implementation and effectiveness monitoring plans. By concentrating implementation monitoring efforts on the "no" answers, greater efficiency of resources (people, dollars, time) can be achieved. The limited resources of the local manager in monitoring riparian-wetland parameters can be prioritized to those factors that are currently "out of range" or at risk of going out of range. The role of research may extend to validation monitoring of many of the parameters.

PFC wasn't: Designed to be a long term monitoring tool but it may be an appropriate part of a well designed monitoring program.

PFC isn't: Designed to provide monitoring answers about attainment of desired conditions. However, it can be used to provide a thought process on whether a management strategy is likely to allow attainment of desired conditions.

PFC can: Reduce the frequency and sometimes the extent of more data and labor intensive inventories. PFC can reduce process by concentrating efforts on the most significant problem areas first and thereby increasing efficiency.

PFC can't: Eliminate the need for more intensive inventory and monitoring protocols. These will often be needed to validate that riparian-wetland area recovery is indeed moving toward or has achieved desired conditions, e.g., good quality habitat; or simply establish what the existing habitat quality is.

PFC is: A qualitative assessment based on quantitative science. The PFC assessment is intended for individuals with local, on-the-ground experience in the kind of quantitative sampling techniques that support the checklist. These quantitative techniques are encouraged in conjunction with the PFC assessment for individual calibration, where answers are uncertain, or where experience is limited. PFC is also an appropriate starting point for determining and prioritizing the type and location of quantitative inventory or monitoring necessary.

PFC isn't: A replacement for quantitative inventory or monitoring protocols. PFC is meant to complement more detailed methods by providing a way to synthesize data and communicate results.

PFC Checklist

The following section contains the PFC checklist as used by BLM staff and others in the field. Immediately following are the general instructions, and then the two pages of the checklist itself.

General Instructions

- 1) The concept "**Relative to Capability**" applies wherever it may be inferred.
- 2) This checklist constitutes the **Minimum National Standards** required to determine Proper Functioning Condition of lotic riparian-wetland areas.
- 3) As a minimum, and **ID Team** will use this checklist to determine the degree of function of a riparian-wetland area.
- 4) Mark one box for each element. Elements are numbered for the purpose of cataloging comments. The numbers do not declare importance.
- 5) For any item marked "**No**," the severity of the condition must be explained in the "**Remarks**" section and must be a subject for discussion with the ID Team in determining riparian-wetland functionality. Using the "**Remarks**" section to also explain items marked "**Yes**" is encouraged but not required.
- 6) Based on the ID Team's discussion, "**functional rating**" will be resolved and the checklist's summary section will be completed.
- 7) Establish photo points where possible to document the site.

Standard Checklist

Name of Riparian-Wetland Area: _____

Date: _____ Area/Segment ID: _____ Miles: _____

ID Team Observers: _____

Yes	No	N/A	HYDROLOGIC
			1) Floodplain inundated in "relatively frequent" events (1-3 years)
			2) Active/stable beaver dams
			3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
			4) Riparian zone is widening or has achieved potential extent
			5) Upland watershed not contributing to riparian degradation

Yes	No	N/A	VEGETATIVE
			6) Diverse age-class distribution (recruitment for maintenance/recovery)
			7) Diverse composition of vegetation (for maintenance/recovery)
			8) Species present indicate maintenance of riparian soil moisture characteristics
			9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high streamflow events
			10) Riparian plants exhibit high vigor
			11) Adequate vegetative cover present to protect banks and dissipate energy during high flows
			12) Plant communities in the riparian area are an adequate source of coarse and/or large woody debris

Yes	No	N/A	SOILS-EROSION DEPOSITION
			13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody debris) adequate to dissipate energy
			14) Point bars are revegetating
			15) Lateral stream movement is associated with natural sinuosity
			16) System is vertically stable
			17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Remarks

Summary Determination

Functional Rating:

Proper Functioning Condition _____
Functional -- At Risk _____
Nonfunctional _____
Unknown _____

Trend for Functional -- At Risk:

Upward _____
Downward _____
Not Apparent _____

Are factors contributing to unacceptable conditions outside BLM's control or management?

Yes _____
No _____

If yes, what are those factors?

- ___ Flow regulations
- ___ Mining activities
- ___ Upstream channel conditions
- ___ Channelization
- ___ Road encroachment
- ___ Oil Field water discharge
- ___ Augmented flows
- ___ Other (specify) _____

APPENDIX 24: DOCUMENTATION FORM USED BY BLM - EAGLE LAKE FIELD OFFICE

DOCUMENTATION FORM FOR DETERMINATIONS: ACHIEVEMENT OF RANGELAND HEALTH STANDARDS, CONTRIBUTING FACTORS AND APPROPRIATE ACTION PRIORITIES

■■■■■■■■■■

THIS FORM DOCUMENTS, FOR THE INDICATED AREA: (1) DETERMINATIONS AND SUPPORTING RATIONALE REGARDING IF FUNDAMENTAL RANGELAND HEALTH CONDITIONS CITED IN 43 CFR 4180.1 EXIST IN THESE AREAS; (2) DETERMINATIONS, IN CASES WHERE ONE OR MORE CONDITIONS OF FUNDAMENTAL RANGELAND HEALTH DO NOT EXIST, REGARDING THE STANDARD(S) THAT IS (ARE) NOT ACHIEVED; (3) DETERMINATIONS, IN THOSE CASES WHERE ONE OR MORE STANDARDS ARE NOT ACHIEVED, REGARDING THE CONTRIBUTING FACTOR(S) THAT IS (ARE) PREVENTING STANDARD(S) ACHIEVEMENT OR IS (ARE) PREVENTING SIGNIFICANT PROGRESS TOWARDS ITS (THEIR) ACHIEVEMENT; AND, (4) THE INFORMATION THAT WAS EXAMINED THAT SUPPORT THESE DETERMINATIONS.

■■■■■■■■■■

Indicate the date(s) or period the information review occurred: _____

PART I - IDENTIFICATION OF RELEVANT AREA

A. Indicate area where these determinations and rationale apply:

1. ☐ Site (Specific Geographic Area) within Management Unit (allotment or pasture):
Allotment name/no.: _____
Place name: _____
Legal location (if needed to ID site): _____
Approximate size in acres: _____
(or linear length if lotic riparian)
2. ☐ Management Unit (allotment or pasture - list name / no. / acres):

3. ☐ Landscape (identify by groups of management units, or by watershed if cross-cutting MU's and list):

4. ☐ Other Stratification (identify - e.g., all riparian areas in XYZ Pasture):

PART II - IDENTIFICATION OF INFORMATION REVIEWED

The following information (e.g. monitoring, literature, personal communication, etc.) was considered to determine standards attainment and, if applicable, contributing factor(s) to their non-achievement and failure to make significant progress towards their achievement. (if more room is needed to document the type of information reviewed, label and attach sheets as needed)

A. Information relevant to Susanville RAC SOILS HEALTH STANDARD. This is:

SUSANVILLE RAC (Standard 1):

Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform, and exhibit functional biological chemical and physical characteristics.

Indicator(s) Observed

Information Reference (i.e. identify the information source used by type and date)

Soil Stability Indicators

☐ SSCR Form (6630-4)

☐ SSF Form (7310-12)

☐ RUSLE Form

☐ WEPP Form

☐ WEE Form

Productivity Indicators

Biological

☐ litter and organic matter

☐ microbial

☐ cryptogam/microphyte

Physical

☐ bulk density

☐ porosity

Chemical

☐ available nutrients

☐ CEC

☐ SAR

Comments / Remarks:

B. Information relevant to the Susanville RAC STREAM HEALTH STANDARD. This is:

SUSANVILLE RAC (Standard 2):

Stream channel form and function are characteristic for the soil type, climate and landform.

Indicator(s) Observed

Information Reference (i.e. identify the information source used by type and date)

☐ RFA

☐ hydrologic

☐ erosion / deposition

☐ vegetative (obligate,
facultative and others)

Comments / Remarks:

C. Information relevant to the Susanville RAC WATER QUALITY STANDARD. This is:

SUSANVILLE RAC (Standard 3):

Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the State standards within the respective boundaries of the States of California and Nevada.

Indicator(s) Observed

Information Reference (i.e. identify the information source used by type and date)

- ☐ State Designated Beneficial Uses: ☐ Mun ☐ Agr ☐ Pro ☐ Ind ☐ Gwr ☐ Fresh ☐ Nav ☐ Pow
☐ Rec1 ☐ Rec2 ☐ Comm ☐ Aqua ☐ Warm ☐ Cold ☐
☐ Sal ☐ Wild ☐ Biol ☐ Rare ☐ Migr ☐ Spwn ☐ Wqe ☐ Fld

☐ Site specific beneficial uses:

Water Quality Variables

- ☐ temperature
☐ dissolved oxygen
☐ suspended sed./turbidity
☐ nutrients
☐ Coliform bacteria/pathogens

Water Quality Indicators

- ☐ invertebrates types
☐ vertebrate condition
☐ riparian condition
☐ bank & bed condition
☐ nuisance aquatic growths

Comments / Remarks:

D. Information relevant to the Susanville RAC RIPARIAN AND WETLAND SITES STANDARD. This is:

SUSANVILLE RAC (Standard 4):

Riparian and Wetland areas are in properly functioning condition and are meeting regional and local management objectives.

Indicator(s) Observed

Information Reference (i.e. identify the information source used by type and date)

- ☐ RFA
☐ hydrologic
☐ vegetation (obligate, facultative and others)
☐ soils - erosion / deposition

Comments / Remarks:

E. Information relevant to the Susanville RAC BIODIVERSITY STANDARD. This is:

SUSANVILLE RAC (Standard 5):

Viable, healthy, productive and diverse populations of native and desired plant and animal species, including special status species, are maintained.

<u>Indicator(s) Observed</u>	<u>Information Reference (i.e. identify the information source used by type and date)</u>
<input type="checkbox"/> community diversity	_____
<input type="checkbox"/> community structure (layers)	_____
<input type="checkbox"/> exotic plants (or invaders)	_____
<input type="checkbox"/> plant vigor (production, mortality, decadence)	_____
<input type="checkbox"/> diversity of age classes	_____
<input type="checkbox"/> recruitment	_____
<input type="checkbox"/> wildlife life forms present (obligate)	_____
<input type="checkbox"/> special status species	_____

Comments / Remarks:

PART III - SUMMARY OF STANDARDS ACHIEVEMENT DETERMINATION AND RATIONALE

A. DETERMINATION ON STANDARDS ACHIEVEMENT

As of the date of the completion of this form, an examination of the information listed in Part II and recent field visits, if applicable, indicate the following with regard to standards achievement for the area identified in Part I:

<u>Standard</u>	<u>Determination on Standard Achievement</u> (check appropriate box for each standard)
Soils Health	<input type="checkbox"/> Met / <input type="checkbox"/> Not met but progressing towards / <input type="checkbox"/> Not met and not progressing towards / <input type="checkbox"/> N/A
Stream Health	<input type="checkbox"/> Met / <input type="checkbox"/> Not met but progressing towards / <input type="checkbox"/> Not met and not progressing towards / <input type="checkbox"/> N/A
Water Quality	<input type="checkbox"/> Met / <input type="checkbox"/> Not met but progressing towards / <input type="checkbox"/> Not met and not progressing towards / <input type="checkbox"/> N/A
Riparian/Wetland	<input type="checkbox"/> Met / <input type="checkbox"/> Not met but progressing towards / <input type="checkbox"/> Not met and not progressing towards / <input type="checkbox"/> N/A

Biodiversity

☐ Met / ☐ Not met but progressing towards / ☐ Not met and not progressing towards / ☐ N/A

- B. RATIONALE SUPPORTING STANDARDS ACHIEVEMENT DETERMINATION (if additional room is needed, attach and label additional sheets):

PART IV - FOR THOSE STANDARDS NOT ACHIEVED, SUMMARY OF CONTRIBUTING FACTOR(S) DETERMINATION AND SUPPORTING RATIONALE

A. DETERMINATION ON CONTRIBUTING FACTORS

As of the date of the completion of this form, an examination of the information listed in Part II and recent field visits, if applicable, indicate that the following are contributing factors for failing to achieve the standards as indicated in Part III for the area identified in Part I:

Non-achieved Standard (s) (from Part III): _____

FLPMA Principal or Major Uses information date)

Information Reference (what data was reviewed - type and

☐ Domestic Livestock Grazing

☐ actual grazing use _____
☐ grazing "licenses" _____
☐ utilization records _____
☐ field notes / photographs _____
☐ other _____

☐ Fish and Wildlife Development and Utilization

☐ _____

☐ Mineral Exploration and Development

☐ _____

☐ Rights-of-way

☐ _____

☐ Outdoor Recreation

☐ _____

☐ Timber Production

☐ _____

Other Events or Circumstances Considered Information Reference (what data was reviewed - type and information date)

☐ Wild horse and Burro use

☐ census / distribution data _____
☐ other _____

☐ exotic plant presence

☐ insect impacts

☐ abnormal fire frequency or lack of fire

☐ abnormal climatic events

☐ other _____

CONTRIBUTING FACTOR(S) (LIST):

B. RATIONALE FOR CONTRIBUTING FACTOR DETERMINATION

PART V - BLM STAFF WHO REVIEWED THE INFORMATION AND RECOMMENDED PRIORITY FOR DEVELOPMENT AND IMPLEMENTATION OF APPROPRIATE ACTION TO MAKE SIGNIFICANT PROGRESS TOWARDS ACHIEVING THE STANDARD(S)

The following staff have participating in examining the information listed in Part II and in making the standard(s) achievement and contributing factor determination(s).

In the cases where the standards are not achieved and after considering all relevant information, we recommend that the priority for developing and implementing appropriate action to achieve standards in the area identified in Part I be (check one):

☐ high ☐ medium ☐ low

We base our recommendation on the following ratings of the following factors:

Biological / Physical

Severity of resource impacts resulting from non-achievement of the standard - ☐ high ☐ medium ☐ low

Size of affected area -

Acres _____

Ability to arrest further degradation -

☐ easily done ☐ unknown ☐ difficult

Other _____

Administrative

Proportion of federal land in the allotment -

☐ high ☐ medium ☐ low

Pending administrative actions (permit lease renewal/transfer, etc.) - ☐ pending ☐ not pending until FY _____

Other _____

Social

Anticipated cooperation of the permittee / lessee -

☐ expected ☐ not expected

Legal requirements

☐ compelling ☐ not compelling

Other _____

Economic Considerations

SIGNATURES

TITLES

Rangeland Management Specialist

Wildlife Biologist

Botanist

Watershed Specialist

COMMENTS:

PART VI - DOCUMENTATION OF THE INVOLVEMENT OF PERMITTEES, STATE AGENCIES AND THE INTERESTED PUBLIC IN MAKING STANDARDS CONFORMANCE DETERMINATION AND CONTRIBUTING FACTORS DETERMINATION

Indicate the occurrence of public participation (e.g. permittee, interested public, other Federal or State /local agency), or opportunities for public participation that pertains to the review of standards achievement and contributing factors (who, when, and conversation or meeting summary):

PART VII - AUTHORIZED OFFICER'S DETERMINATION AND PRIORITY FOR APPROPRIATE ACTION DEVELOPMENT AND IMPLEMENTATION

I have reviewed and concur with the determinations and supporting rationale regarding the achievement or lack thereof of rangeland health standards documented herein and, in the cases where standards are not achieved, the determination and rationale regarding the contributing factor(s) for failure to achieve the standards. I have determined that the priority for developing and implementing appropriate action to achieve significant progress to achieve standards for the area identified in Part I is (check one)

☐ high ☐ medium ☐ low .

Staff is directed to develop appropriate action for my consideration and implementation in accordance with this priority.

EAGLE LAKE FIELD MANAGER

DATE

COMMENTS:

APPENDIX 25 - A QUALITATIVE PROCEDURE TO ASSESS RANGELAND HEALTH (DRAFT)

[The following is a draft version of a qualitative procedure to assess rangeland health. This draft was prepared by a BLM team headed by Mike Pellant of the BLM Idaho State Office. The procedure was developed in cooperation with academic rangeland scientists, environmental groups, and others interested in rangeland health assessment. Field tests involving these outside interests were held in several places in the West. A BLM Technical Reference incorporating this procedure is in preparation; it should be completed and available by spring 1998. While there may be some minor changes to what is shown in this appendix, the Technical Reference is expected to be substantially similar to the procedure as described here.]

Introduction

Rangeland managers and the public are in a debate about the condition of our nations rangelands. Issues of these conditions continue to be fueled over issues such as grazing fees and state versus federal management of western rangelands. Range managers have struggled to develop cost efficient and accurate assessment procedures since the public rangelands were first allocated.

Early rangeland inventory techniques included combinations of quantitative and qualitative data gathering to identify livestock carrying capacity and stocking levels. An Interagency Range Survey Committee developed a procedure based on ocular estimates of cover and vegetation composition to determine livestock forage production in 1937. Included in this procedure were qualitative procedures to determine soil erosion status (Wagner 1989). Early monitoring procedures (e.g., the Deming Two-phase and Parker Three-Step methods included a "scorecard approach" using indicators to determine "site-soil stability" and usefulness of forage for livestock grazing; Wagner 1989).

The Bureau of Land Management used "soil surface factors" to determine erosional status of large acreages of public lands in the 1970's (USDI 1973). By 1980 the emphasis in public land monitoring and inventory had shifted to the collection of quantitative data e.g. the Bureau of Land Management's Soil-Vegetation Inventory Method (Wagner 1989).

Interest in the use of qualitative assessment procedures surfaced again in the 1990's. The Bureau of Land Management published a Technical Reference (TR 1737-9) in 1993 that utilized a qualitative checklist to assess the functioning condition of riparian areas (USDI 1993). The National Research Council published a book on Rangeland Health (West et al. 1994) that included a matrix of indicators to qualitatively assess rangeland health.

Concurrently, a committee of the Society for Range Management developed an approach to identify thresholds of soil stability for sustainable management (Task Group on Unity in Concepts and Terminology 1995). The Western Regional Research Coordinating Committee-40 on Rangeland Research reviewed monitoring and inventory techniques of the various federal land management agencies and concluded that cost effective and efficient assessment techniques were needed (Range Improvement Task Force 1994).

These recent publications served as the impetus and direction for initiation of an interagency workgroup whose task was to develop and field test an assessment procedure for rangeland health that relied entirely on qualitative measurements or judgments. This workgroup benefitted greatly from reviews of historic qualitative assessment techniques and the recommendations on new approaches provided by the Society for Range Management, National Research Council, and the Range Improvement Task Force.

What is Rangeland Health?

The 1994 National Research Council publication, "Rangeland Health, New Methods to Classify, Inventory, and Monitor Rangelands" defined rangeland health as:

"the degree to which the integrity of the soil and ecological processes of rangeland ecosystems are maintained"

Stated differently, healthy rangelands are present when ecological processes are functioning properly to maintain the structure, organization, and activity of an ecosystem over time. The end product is an ecological system that is capable of sustaining the capacity of rangelands to satisfy values and produce commodities.

Ecological processes include the water cycle (the capture, storage and release of precipitation) energy flow (conversion of sunlight to plant then animal matter) and nutrient cycling (the flow of nutrients such as nitrogen and carbon through the physical and biotic environments). Ecological processes functioning within a normal range of variation will support appropriate kinds and proportions of flora and fauna. Direct measure of the efficiency of the ecological processes is difficult due to the complexity of the interrelationships. Therefore, vegetation attributes are often used to estimate the functional status of ecological processes.

Purpose

Certain public land issues become controversial due to the inability of participants to agree if a problem even exists. If the basic procedures to foster the visualization, communication and resolution of rangeland health issues are available, then people with diverse backgrounds can work together to find common ground. A qualitative procedure to assess rangeland health is proposed as an effective communication and assessment tool to arrive at local resolution of rangeland health issues. This procedure is also proposed as a tool to identify areas where rangeland health is satisfactory, at risk or unsatisfactory without establishing cause or trend of the condition.

INDICATORS

Unfortunately, ecological processes are difficult to observe or monitor in the field due to the complexity of most rangeland systems. To characterize the health status of a selected landscape, indicators are used to assess the condition of selected plant and physical environment attributes. An indicator is a component of a system whose characteristics (presence or absence, quantity, distribution) are used as an index of those attributes that are too difficult, inconvenient, or expensive to measure.

Historically, resource inventories and monitoring by land management agencies focused on vegetation attributes (production, composition, density, etc.) and soil stability. Such assessments are inadequate to determine rangeland health because they do not reflect the complexity of the ecosystem. There is no one indicator of ecosystem health; instead a suite of key indicators should be used for an assessment (Karr 1992).

The Qualitative Assessment of Rangeland Health procedure includes four categories:

1. Cover by vegetation lifeform and ground cover for site protection (see attached **Cover Worksheet**).
2. Species abundance relative to dominant plant cover (see attached **Species Abundance Worksheet**).
3. Physical environment status based upon 10 indicators (see attached **Physical Environment Worksheet**).
4. Biotic environment status based upon 8 indicators (see attached **Biotic Environment Worksheet**).

A **Rangeland Health Site Documentation worksheet** (attached) is also completed to record location of assessment, ecological site(s), and other relevant landform features and site uses.

In this Qualitative Assessment Procedure, physical and biotic indicators are evaluated in the field and an appropriate descriptive category is selected for each indicator. The descriptive categories roughly correspond to functioning (healthy), at risk, and improperly functioning (unhealthy) condition.

Physical Environment Rating

In the physical (i.e., abiotic) environment, indicators are used to assess soil and watershed stability. Soil stability and proper watershed function are important because they promote normal capture, storage, and release of water. Indicators of soil and watershed condition are listed in the attached **Physical Environment Worksheet**. Information on the **Cover Worksheet** should be reviewed prior to completing the **Physical Environment Worksheet**.

Biotic Environment Rating

In the biotic environment, indicators are used to assess the integrity, structure, and function of the flora, fauna, and ecological processes. Most indicators in the biotic environment are focused on vegetation attributes since they are the most easy to observe during the short period of time allocated to conducting the qualitative assessment. Biotic indicators are listed in the **Biotic Environment Worksheet**. Both the **Species Abundance and Cover Worksheets** should be reviewed prior to completing the **Biotic Environment Worksheet**. The physical and biotic indicators on the worksheets represents the minimum requirements to subjectively assess health status in most ecosystems. Indicators can be added or deleted for unique situations in an ecosystem.

Ecological Reference Areas

Before assessing the health of specific landscape units, some understanding of the structure, function, and dynamics of the local landscape is required. To obtain this understanding, field personnel use Ecological Reference Areas (ERAs) for training and as comparison areas for site evaluations. An ERA is a landscape unit in which ecological processes are functioning and the vegetation complex has adequate resistance to and resiliency from major disturbance. This concept is similar to that proposed by the Western Regional Research Coordinating Committee-40 on Rangeland Research, which proposed using well-managed rangelands and appropriate relict areas on given ecological sites as benchmarks for assessments (West et al. 1994).

At each ERA, an interdisciplinary team takes photographs and records baseline information on system attributes and indicator status by completing all worksheets and conducting quantitative cover studies. This information is used for training, future comparisons, and developing photo guides for assessment of landscape units with similar site potentials.

Interpreting Indicators

The critical link between observational measurements of indicators and determining the health status of a landscape is the interpretation process. The indicators are evaluated and a final status determination of physical and biotic status is made. This procedure relies upon the collective experience and knowledge of the interdisciplinary team to rate the indicators and make the final physical and biotic rating.

This process produces separate ratings for the physical and biotic environment for each landscape unit. The physical environment utilizes the same final rating of:

1) Functioning, 2) At Risk, and 3) Improperly Functioning.

The biotic environment is classified into three categories following the wording in the Rangeland Health publication (Committee on Rangeland Classification 1994):

2. Biotically: a) Healthy, b) At Risk, and c) Unhealthy

Determination of the physical and biotic status is based upon a "preponderance of evidence" approach. The relative significance and rating of each indicator are determined by an interdisciplinary team to arrive at the physical and biotic status of a landscape unit.

The Improperly Functioning and Unhealthy ratings are further subdivided into "reversible" and "irreversible" categories. This classification allows the separation of landscape units that will recover with management changes in a 20-30 year period with those that will require artificial restoration involving high labor and material costs. An example of an irreversible, unhealthy ecosystem is the cheatgrass monocultures in Idaho's Snake River Plain. The system is biotically unhealthy and would require competition control (i.e., herbicide or mechanical control of cheatgrass and reseeding with perennial vegetation) to move it back to a healthy rating.

Applications

This process is intended to provide resource managers and the public with a tool to determine the health status of selected rangeland landscapes in a relatively short period of time. The primary purpose is to serve as a communication tool to help educate and train BLM's many customers and stakeholders as well as its own managers and resource specialists.

The assessment procedure does not establish the cause of at risk or unhealthy rangelands; it simply identifies where a problem exists. This procedure is not intended nor designed to replace quantitative monitoring, serve as a trend indicator, or provide data that can be aggregated for a national report on rangeland health.

SUMMARY

Qualitative assessments of rangeland health provide land managers with timely information on site stability and biotic integrity. Early warnings of resource problems allow application of remedial management actions before site degradation proceeds to a nonfunctioning or unhealthy situation. However, more research is needed to quantify indicator attributes and identify thresholds for physical and biotic status. Once this information is available the assessment of rangeland health will become more of a "science" and less of an "art."

LITERATURE CITED

- Committee on Rangeland Classification. 1994. Rangeland Health: New methods to classify, inventory, and monitor rangelands. Board on Agriculture, National Research Council, National Academy Press, Washington D.C.
- Hunsaker, C.T., D.E. Carpenter, and J.J. Messer. 1990. Ecological indicators for regional monitoring. *Bulletin of the Ecological Society of America*. 71 (3):165-172.
- Karr, J. R. 1992. Ecological integrity: Protecting earth's life support systems. p. 223-238. *In* R. Costanza, B. G. Norton, and B. D. Haskell (eds.), *Ecosystem Health-New Goals for Environmental Management*, Island Press, Washington, D.C.
- Task Group on Unity in Concepts and Terminology. 1995. New concepts for assessment of rangeland condition. *Journal of Range Management*. 48:271-282.
- U.S. Department of the Interior, Bureau of Land Management. 1973. Determination of Erosion Condition Class, Form 7310-12. Washington D.C.: U.S. Department of the Interior.
- U.S. Department of the Interior, Bureau of Land Management. 1993. Riparian Area Management: Process for Assessing Proper Functioning Condition. Technical Reference 1737-9. Service Center, Denver, CO: U.S. Department of the Interior.
- Wagner, R.E. 1989. History and development of site and condition criteria in the Bureau of Land Management. p. 35-48. *In*: W.K. Lauenroth and W.A. Laycock (eds.), *Secondary Succession and the Evaluation of Rangeland Condition*, Westview, Boulder, Colo.
- West, N.E., McDaniel, K., Smith, E.L., Tueller, P.T., Leonard, S. 1994. Monitoring and interpreting ecological integrity on arid and semi-arid lands of the western United States. Report 37. New Mexico State University, New Mexico Range Improvement Task Force.

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Cover Worksheet

ESTIMATED LIFEFORM AND GROUND COVER (%)							
COVER CLASSES	0	1-5	6-15	16-30	31-50	51-75	75-100
LIFEFORMS							
I - GRASS							
Annuals							
Native Perennial							
Exotic Perennial							
II - FORB							
Annual							
Perennial							
III - SHRUBS							
IV - TREES							
V - SUCCULENTS							
GROUND COVER							
I - LITTER							
II - BARE GROUND							
III - ROCK/GRAVEL							
IV -CRYPTOGAMS							
V -VASCULAR PLANTS							

All ground cover in Categories I.-IV. are estimated from interspace areas only. Category V. Is an estimate of total vascular plant cover.

COMMENTS-

Species Abundance Worksheet

The dominant species are ranked (1-3) according to abundance on the site (1-4, Section I) and by lifeform (1-3, Section II). Abundance is determined based upon cover. Noxious weeds are also identified by species (Section III).

Section I- Dominant Species on Site

1. _____
2. _____
3. _____
4. _____

Section II- Dominant species by lifeform

Annual Grasses.

1. _____
2. _____
3. _____

Annual Forbs.

1. _____
2. _____
3. _____

Perennial Grasses

1. _____
2. _____
3. _____

Perennial Forbs

1. _____
2. _____
3. _____

Shrubs and Trees

1. _____
2. _____
3. _____

Section III- Noxious weeds

1. _____
2. _____
3. _____

Comments _____

Rangeland Health Site Documentation

State _____ District/Region _____

Management Unit _____ Watershed _____

Major Land Resource Unit _____

Identification Number or Name (if applicable)_____

Location: Legal T.____ ,R.____ , Sec.____ , ____1/4, ____ 1/4.

Latitude _____ , Longitude _____

UTM Coordinates _____

Observers:_____ **Date:**_____

SITE CHARACTERISTICS

Ecological Site_____

Soil Map Unit Name _____

Geology or Parent Material_____ Aspect_____

Slope _____ Elevation_____ft. Topographic position _____

Climate: Annual Precipitation _____

Recent climate: 1)Drought____, 2) Normal____, or 3) Wet Period____

SITE USES

Describe wildlife and livestock use in the area of the
assessment_____

Describe evidence of recent disturbance (wildfire, recreation,
grasshoppers, etc.)_____

COMMENTS_____

Physical Environment Worksheet

Relative to Ecological Reference Area(s)-ERA

Indicator	Plus	Intermediate	Minus
1. Flow Patterns	Few, slight deposition	Well defined, small with intermittent deposits	Numerous with soil deposits common
2. Surface Litter	In place or slight movement	Moderate movement, bigger litter displaced	Extreme movement, occurs with each event
3. Soil Movement - Water	None to slight	Moderate, slight terracing & some short pedestals	Significant movement with each event, rocks and plants on pedestals, some roots exposed
4. Soil Movement- Wind	None to slight	Wind scoured depressions evident, small aeolian deposits around plant clumps	Wind scoured depressions common with large aeolian deposits around plant clumps
5. Soil Crusting & Surface Sealing	None to minimal with "soft" physical and/or chemical crusts	Physical and/or chemical crusting obvious with reduced infiltration occurring	Hard physical and chemical crusts widespread on bare ground, strongly reducing infiltration
6. Compaction Layer	None to minimal, not restrictive	Thin, weakly restrictive to roots and water	Extensive with > 1" width, strongly restrictive
7. Rills	If present, rare and widely spaced	Occasionally present, < 3" deep	Very common at 5' or less intervals, up to 6" deep
8. Gullies	None to few, if present gullies are healing (veg. on sides & bottom)	Few present, active erosion (incised sides) on <10% of length	Numerous with active erosion on 20% or more of length, some headcutting evident
9. Cover- Amount (veg, litter, rock etc.)	Adequate (>X %) to protect site from accelerated erosion.	Marginal (around X %) for site protection, accelerated erosion starting	Inadequate (<X %) for site protection, accelerated erosion evident
10. Cover-Distribution	Well distributed with bare ground areas small	Bare ground areas larger, more numerous and less uniform in distribution	Bare ground areas numerous over large areas, most cover is under trees or shrubs, if present

Ecological Reference Area-->

Test Site(s)-->

Rating: 1. Functioning___ 2. At Risk___ 3. Improperly Functioning: a)Reversible___ or, b)
Irreversible___

Comments on Indicators

1. Flow Patterns
2. Surface Litter
3. Soil Movement- Water
4. Soil Movement- Wind
5. Soil Crusting & Surface Sealing
6. Compaction Layer
7. Rills
8. Gullies
9. Cover- Amount
10. Cover- Distribution

Biotic Environment Worksheet

Relative to Ecological Reference Area(s)-ERA

Indicator	Plus	Intermediate	Minus
1. Community Diversity	Good representation of lifeforms and #'s of species	One or two lifeforms poorly represented, #'s of species 30% of expected (ERAs)	Lifeforms dominated by one class, #'s of species < 50% of expected (ERAs)
2. Community Structure	Good diversity of height, size and distribution of plants including roots (vertical distribution)	Marginal diversity of height, size and distribution of plants and their roots	Plant community dominated by 1-2 lifeforms with poor height, size and distribution of species and their root systems
3. Exotic Plants (or invaders)	Absent or sparse, pose little threat of expansion	Present along roads or scattered in plant community, pose threat of further expansion	Common in plant community with areas of exotic plant dominance
4. Photosynthesis Activity	Length and distribution similar to ecological reference area	Length and distribution is marginal compared to ecological reference area	Length and distribution dissimilar to ecological reference area
5. Plant Status	Majority of plants are productive and alive	Signs of mortality in important species, production of remaining plants declining	Dead or decadent plants readily evident, production of remaining plants is poor.
6. Seed Production	Numbers of seedstalks/seed adequate for stand maintenance of all lifeforms	Plants stressed resulting in reduced seedstalk and seed production of some lifeforms	Seed/seedstalks inadequate for stand replacement (of all lifeforms) during favorable recruitment periods
7. Recruitment	Evidence of recruitment (seedlings, juveniles or vegetative spread) in last 10 years	Recruitment in last 10 years is spotty and not fully representative of each lifeform	Minimal evidence of recruitment in last 10 years; some lifeforms have a high % of dead or decadent plants
8. Nutrient Cycle	Mechanisms (leguminous plants, cryptogamic crust, litter, etc) are adequate for plant maintenance)	Mechanisms are marginally adequate for plant maintenance and lifeform representation	Mechanisms are inadequate to maintain plant community lifeforms

Ecol Ref Area-->

Test site(s)-->

1. Healthy___ 2. At Risk___ 3. Unhealthy: a) Reversible___ b) Irreversible___

Comments on Indicators

1. Community Diversity

2. Community Structure & Root Distribution

3. Exotic Plants

4. Photosynthesis Period

5. Plant Status

6. Seed Production

7. Recruitment

8. Nutrient Cycle

REFERENCES

- Abell, D.L., Technical Coordinator. 1989. Proceedings of the California Riparian Systems Conference: Protection, Management, and Restoration for the 1990's. U.S. Forest Service General Technical Report PSW-110. Pacific Southwest Forest and Range Experiment Station, Berkeley, CA.
- Airola, D.A. 1988. Guide to California Wildlife Habitat Relationships System. Calif. Dept. of Fish and Game. Sacramento, CA. 74 p.
- Anderson, L.D. 1991. Bluebunch wheatgrass defoliation effects and recovery: A review. Technical Bulletin 91-2. Bureau of Land Management, Idaho State Office, Boise, ID.
- Baker, H.G. 1992. Letter to the editor regarding article by Edwards (1992). *Fremontia* 20:32-33.
- Barrett, R.H. 1992. Letter to the editor regarding Article by Edwards (1992). *Fremontia* 20(3):29-30.
- Barry, S. 1995. Vernal pools on California's annual grasslands. *Rangelands* 17(5):173-175.
- Barry, W.J. 1989. A hierarchical vegetation classification system with emphasis on California plant communities. State of California, The Resources Agency, Department of Parks and Recreation, Sacramento, California.
- Bartolome, J.W. 1976. Germination and establishment of plants in California annual grassland. Ph.D. dissertation. University of California, Berkeley.
- Bartolome, J.W., M.C. Stroud, and H.F. Heady. 1980. Influence of natural mulch on forage production on differing California annual range sites. *J. Range Management* 33:4-8.
- Bartolome, J.W. Local temporal and spatial structure. In: L.F. Huenneke and H. Mooney, eds. *Grassland Structure and Function: California Annual Grassland*, pp. 73-80. Kluwer Academic Publishers, Dordrecht, Netherlands.
- Bates, P.A., and J.W. Menke. 1984. Role of fires in blackbrush succession. In: Abstracts, annual meeting of the Society for Range Management, Rapid City, SD, No. 149.
- Belsky. 1992. Letter to the editor regarding paper by Edwards (1992). *Fremontia* 20:30-31.
- Bentley, J.R., and M.W. Talbot. 1948. Annual-plant vegetation of the California foothills as related to range management. *Ecology* 29:72-79.
- Bentley, J.R., and M.W. Talbot. 1951. Efficient use of annual plants on cattle ranges in the California foothills. Circular No. 870. U.S. Department of Agriculture, Washington, D.C.
- Blumler, M.A. 1992. Some myths about California grasslands and grazers. *Fremontia* 20(3):22-27.

- Bock, C.E., J.H. Bock, and H.M. Smith. 1993. Proposal for a system of federal livestock enclosures on public rangelands in the western United States. *Conservation Biology* 7(8):781-788.
- Branson, F.A., J.F. Gifford, K.G. Renard, and R.F. Hadley. 1972. *Rangeland Hydrology*. Society for Range Management. Edition 2, 1981. Kendall / Hunt Publishers. Dubuque, IA.
- Bronson, M. 1992. Effects of longer versus short-duration cattle grazing on winter forage available to mule deer in the northern Sierran Nevada foothills. M.S. Thesis. University of California, Davis.
- Brown, R.L. 1982. Effects of livestock grazing on Mearn's quail in southeastern Arizona. *Journal of Range Management* 35:727-733.
- Bryant, H.T., R.E. Blaser, and J.R. Peterson. 1972. Effect of trampling by cattle on bluegrass yield and soil compaction of a Meadowville loam. *Agronomy Journal* 64:331-334.
- Bull, E. and J. Skovlin. 1982. Relationships between avifauna and stream-side vegetation. *Trans. N. Amer. Wild. Nat. Resource Conf.* 47:496-506.
- Burcham, L.T. 1957. *California range land*. California Division of Forestry, Sacramento, CA.
- Burcham, L. 1981. *California range land: An historic-ecological study of the range resource of California*. Center for Archeological Research at Davis. Pub. Num. 7. 256 p.
- Bureau of Land Management. 1984 (a). *Actual use studies*. TR 4400-2. USDI Bureau of Land Management, Denver, CO.
- Bureau of Land Management. 1984 (b). *Manual Section H-4410-1 -- National Range Handbook*. [Procedures for Conducting the Ecological Site Inventory -- Supplements SCS 1976.]
- Bureau of Land Management. 1988. *California Rangeland Monitoring Handbook*. Manual Handbook H-4400-1. California State Office, Sacramento, CA.
- Bureau of Land Management. 1989. *California Fish and Wildlife 2000*. California State Office, Sacramento, CA. 121 pg.
- Bureau of Land Management. 1993. *Riparian area management: Greenline riparian-wetland monitoring*. TR 1737-8. USDI Bureau of Land Management, Denver, CO.
- Bureau of Land Management. 1994. *Riparian area management: Process for assessing proper functioning condition for lentic riparian-wetland areas*. TR 1737-11. USDI Bureau of Land Management, Denver, CO.
- Bureau of Land Management. 1995a. *Riparian area management -- Process for assessing proper functioning condition*. TR 1737-9 (1993). USDI Bureau of Land Management, Denver, CO.

Bureau of Land Management. 1995b. Final Rule. 43 CFR Parts 1780 and 4100. Federal Register 60(35):9894-9971. February 22, 1995.

Bureau of Land Management, U.S. Forest Service. 1994. Rangeland Reform '94 Draft Environmental Impact Statement (Draft and Final). USDI Bureau of Land Management, Washington, D.C.

Bureau of Land Management, Cooperative Extension Service, U.S. Forest Service, and natural Resource Conservation Service. 1996a. Sampling vegetation attributes. Interagency Technical Reference. Report No. BLM/RS/ST-96/002+1730, Bureau of Land Management, National Applied Resource Science Center, Denver, CO.

Bureau of Land Management, Cooperative Extension Service, U.S. Forest Service, and natural Resource Conservation Service. 1996b. Utilization studies and residual measurements. Interagency Technical Reference. Report No. BLM/RS/ST-96/004+1730, Bureau of Land Management, National Applied Resource Science Center, Denver, CO.

Burkhardt, J.W. 1996. Herbivory in the Intermountain West. Station Bulletin 58. Idaho Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow, Idaho.

California Agricultural Commissioner. 1995 Annual Crop Report. Information from the counties of: Fresno, Kern, Lassen, Modoc, Mono, San Benito, San Luis Obispo, Tulare.

California Department of Fish and Game. 1991. Final Environmental Document: Deer Hunting. State of California, the Resources Agency, Department of Fish and Game. 1416 Ninth Street, Sacramento, CA.

California Department of Fish and Game. 1994a. Final Environmental Document: Elk Hunting. State of California, the Resources Agency, Department of Fish and Game. 1416 Ninth Street, Sacramento, CA.

California Department of Fish and Game. 1994b. Final Environmental Document: Antelope Hunting. State of California, the Resources Agency, Department of Fish and Game. 1416 Ninth Street, Sacramento, CA.

California Department of Parks and Recreation. 1994. 1993-1994 Report -- Off-highway vehicle (OHV) recreation's \$3 billion economic impact in California & A profile of OHV users: A family affair. State of California, the Resources Agency, Department of Parks and Recreation, OHV Division, Sacramento, CA.

California Rivers Assessment. 1996. Professional Judgement Assessment of Riparian Condition. Information Center for the Environment. University of California, Davis.

Carrara, P.E., and T.R. Carroll. 1979. The determination of erosion rates from exposed tree roots in the Piceance Basin, Colorado. *Earth Service Processes* 4:307-317.

Castillo, Edward D. 1978. The impact of Euro-American exploration and settlement. *In: Handbook of North American Indians*, Vol. 8: California. Edited by Robt. Heizer. Smithsonian Institution, Washington, D.C.

- Cattelino, P.J., I.R. Noble, R.O. Slatyer, and S.R. Kessel. 1979. Predicting the multiple pathways of plant succession. *J. Environ. Management*. 3(1):41-50.
- Chaney, E., W. Elmore, and W.S. Platts. 1993. Livestock grazing on western riparian areas. Information Center, Inc., Eagle, ID.
- Cheatham, N.H., and J.R. Haller. 1975. An annotated list of California habitat types. Unpublished report, University of California, Berkeley.
- Clary, W.B. 1995. Vegetation and soil responses to grazing simulation on riparian meadows. *J. Range Management* 48:18-25.
- Clary, W.B. and R. Holmgren. 1981. Observations of pronghorn distribution in relation to sheep grazing on the Desert Experiment Station. *Proc. Symposium Wildlife-Livestock Relationships*. Univ. of Idaho. 581-592.
- Clary, W.B. and R.C. Holmgren. 1987. Difficulties in interpretation of long-term vegetation trends. *In: Proceedings of the Symposium on Plant-Herbivore Interactions*. General Technical Report INT-222. U.S. Forest Service, Intermountain Research Station, Ogden, Utah.
- Clary, W.B. and B.F. Webster. 1989. Managing grazing of riparian areas in the Intermountain Region. Gen. Tech. Rpt. INT-263. USDA Forest Service, Intermountain Research Station, Ogden, UT.
- Clary, W.B. and B.F. Webster. 1990. Riparian grazing guidelines for the Intermountain Region. *Rangelands* 12:209-212.
- Clements, F.E. 1916. Plant succession, an analysis of the development of vegetation. Carnegie Inst. Wash. Publ. 242.
- Connell, J.H., and R.O. Slatyer. 1977. Mechanisms of succession in natural communities and their role in community stability and organization. *Amer. Nat.* 111:1119-1144.
- Cook, Sherbourne E. 1996. The Conflict between the California Indian and white civilization. University of California Press, Berkeley.
- Crampton, B. 1974. Grasses in California. University of California Press, Berkeley, CA.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1977. Intermountain flora: vascular plants of the Intermountain West, U.S.A. Vol. 6: The Monocotyledons. Columbia University Press, New York.
- Cummins, K.W., M.A. Wilzbach, D.M. Gates, J.B. Perry, and W.B. Taliaferro. 1989. Shredders and riparian vegetation. *BioScience* 39:24-30.
- Cypher, E., 1996. Preliminary report on 1995 Kern mallow and San Joaquin woolly-threads grazing and competition reduction studies. San Joaquin Valley Endangered Species Recovery Planning Program under Assistance Grant B950-A3-0021 from the Bureau of Land Management.

- Daubenmire, R.F. 1952. Forest vegetation of northern Idaho and adjacent Washington, and its bearing on concepts of vegetation classification. *Ecol. Monogr.* 22:301-330.
- Daubenmire, R.F. 1970. Steppe vegetation of Washington. Washington Agricultural Experiment Station Tech. Bull. 60. Washington State University, Pullman.
- Davis, F.W. 1995. Vegetation change in blue oak and blue oak/foothill pine woodland. Report to California Dept. of Forestry & Fire Protection. Contract 8CA06673.
- D'Azevedo, Warren L. 1986. Handbook of North American Indians, volume 11: Great Basin. Smithsonian Institution, Washington, D.C.
- de Becker, S., and A. Sweet. 1988. Crosswalk between WHR and California vegetation classifications. Pages 21-39 *in*: K.E. Mayer, and W.F. Laudenslayer, eds. 1988. A Guide to Wildlife Habitats of California. State of California, The Resources Agency, Department of Forestry and Fire Protection, Sacramento, California.
- Dittberner, P.L., and M.R. Olson. 1983. The plant information network (PIN) data base: Colorado, Montana, N. Dakota, Utah and Wyoming. U.S. Fish & Wildlife Service FWS/OBS-83/36. Washington, D.C.
- Dopkin, D. 1994. Conservation and management of neotropical landbirds in the northern Rockies and Great Plains. University of Idaho Press. Moscow, ID.
- Douglas, D., J. Ratti, R. Black, and J. Alldredge. 1992. Avian habitat associations in riparian zones of Idaho's Centennial Mountains. *Wilson Bulletin* 104(3):485-500.
- Dyksterhuis, E.J. 1949. Condition and measurement of range land based on quantitative ecology. *J. Range Management.* 2(3):104-115.
- Ecological Society of America. 1995. The scientific basis for ecosystem management. Ecological Society of America, Washington, DC.
- Edwards, S.W. 1992. Observations on the prehistory and ecology of grazing in California. *Fremontia* 20:3-11.
- Ellison, L. 1960. Influence of grazing on plant succession of rangelands. *Botanical Review* 26:1-78.
- Elmore, W. and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. *In*: M.Vavra, W.A. Laycock, and R.D. Pieper, eds., *Ecological Implications of Livestock Herbivory in the West*. Society for Range Management, Denver, CO.
- Environmental Protection Agency. 1993. Monitoring protocols to evaluate water quality effects of grazing management on western rangeland streams. EPA 910/R-93-017. U.S. Environmental Protection Agency, Seattle, WA.
- Evans, R.A., and J.A. Young. 1989. Characterization and analysis of abiotic factors and their influences on vegetation. Pages 13-28 *in*: L.F. Huenneke and H.A. Mooney, eds.

Grassland Structure and Function: California Annual Grassland. Kluwer Academic Publishers, Boston, Massachusetts.

- Federal Register. 1995. *Title 43 -- Public Lands: Interior, Subtitle B -- Regulations Relating to Public Lands, Chapter II -- Bureau of Land Management, Dept. of the Interior, Sub-Chapter D -- Range Management (4000), Part 4100 -- Grazing Administration, Exclusive of Alaska*. 60 FR 9969, Feb. 22, 1995. US Government Printing Office, Washington, D.C.
- Fowler, J.M., D. Rush, and J. Hawkes. 1993. Characteristics of western livestock industry. (In cooperation with the National Cattlemen's Association, Western Livestock Producers Alliance, New Mexico Cooperative Extension Service, and New Mexico State University.) New Mexico Cooperative Extension Service, Las Cruces, N.M.
- Friedel, M.H. 1991. Range condition assessment and the concept of thresholds: a viewpoint. *J. Range Management*. 44:422-426.
- FRRAP (Forest and Rangeland Resources Assessment Program). 1988. California's forest and rangelands: growing conflict over changing uses. Calif. Dept. of Forestry and Fire Protection. 348 p.
- Garrison, B., and R.B. Standiford. 1996. Oaks and habitats of the hardwood rangeland. Chapter 2 in: R.B. Standiford and P. Tinnin, eds. *Guidelines for Managing California's Hardwood Rangelands*. U.C. Div. of Agriculture and Natural Resources, Berkeley, CA.
- Garrison, G.A. 1953. Effects of clipping on some range shrubs. *J. Range Management* 6:309-317.
- Gifford, G.F., and R.H. Hawkins. 1978. Hydrologic Impact of Grazing on Infiltration: A Critical Review. *Water Resources Research*, Vol. 14, No. 2. Paper No. 8W0065.
- Glenn-Lewin, D.C. 1980. The individualistic nature of plant community development. *Vegetatio* 43:141-146.
- Grayson, Donald K. 1993. *The Desert's Past: A national history of the Great Basin*. Smithsonian Institution Press, Washington, D.C.
- Gruell, G.E. 1986. Post-1900 mule deer irruptions in the Intermountain West: principle cause and influences. General Technical Report INT-206. U.S. Forest Service Intermountain Research Station, Ogden, UT.
- Grumbine, R.E. 1994. What is ecosystem management? *Conservation Biology* 8(1):27-38.
- Hall, F.C. 1985. Habitats in managed rangelands -- the great basin of southeastern Oregon: management practices and options. USDA Forest Service, USDI Bureau of Land Management. Gen. Tech. Rpt. PNW-145. 18 pg.
- Hall, F.C., and L. Bryant. 1995. Herbaceous stubble height as a warning of impending cattle grazing damage to riparian areas. Gen. Tech. Rep. GTR-362. U.S. Forest Service, Pacific Northwest Research Station, Portland, OR.

- Harris, G.A. 1977. Root phenology as a factor of competition among grass seedlings. *J. Range Management* 30:172-176.
- Hart, D.R. 1988. An evaluation of die-offs of bitterbrush and sagebrush on range lands in northeastern California. Report No. 88-24. U.S. Forest Service Forest Pest Management, Pacific Southwest Region, San Francisco, CA. (Copies on file at BLM Surprise Resource Area Office, Cedarville, CA and BLM Eagle Lake Resource Area Office, Susanville, CA.)
- Haskell, B.D., B.G. Northon, and R. Costanza. 1993. What is ecosystem health and why should we worry about it? Pp. 3-20 in *Ecosystem Health: New Goals for Environmental Management*, R. Costanza, B.G. Northon and B.D. Haskell, eds. Island Press, Washington, D.C.
- Hastings, M., and J. DiTomaso. 1996. The use of fire for yellow starthistle management. *California Cattleman*, Sept.
- Heady, H.F. 1956. Changes in a California annual plant community induced by manipulation of natural mulch. *Ecology* 37:798-812.
- Heady, H.F. 1972. Burning and the grasslands in California. *Proc. Ann. Tall Timbers Fire Ecol. Conf.* 12:97-107.
- Heady, H.F. 1975. *Rangeland management*. McGraw-Hill, New York.
- Heady, H.F. 1977. Valley grassland. Pages 491-514 in: M.G. Barbour and J. Major, eds. *Terrestrial Vegetation of California*. John Wiley & Sons, New York.
- Heizer, Robert F., editor. 1978. *Handbook of North American Indians*, volume 8: California. Smithsonian Institution, Washington, D.C.
- Hickman, J.E., ed. 1993. *The Jepson manual: higher plants of California*. University of California Press, Berkeley, California.
- Hobbs, R.J., and H.A. Mooney. 1985. Community and population dynamics of serpentine grassland annuals in relation to gopher disturbance. *Oecologia (Berlin)* 67:342-351.
- Holechek, J.L. 1988. An approach for setting the stocking rate. *Rangelands* 10:10-14.
- Holechek, J.L. 1991. Policy changes on federal rangelands: A perspective, or A Wall Street perspective on management of federal rangelands. Invited Paper presented to the National Public Lands Advisory Council, November 19, 1991, Holiday Inn, Golden, CO. [On file at BLM, California State Office.]
- Holechek, J.L., R.D. Pieper and C.H. Herbel. 1989. *Range Management: Principles and Practices*. Prentice Hall, Englewood Cliffs, NJ.
- Holechek, J.L., R.D. Pieper and C.H. Herbel. 1995. *Range Management: Principles and Practices*. 2nd Edition. Prentice Hall, Englewood Cliffs, NJ.

- Holechek, J.L., R.D. Pieper, and C.H. Herbel. 1998. Range management: principles and practices, 3rd edition. Prentice Hall, Upper Saddle River, New Jersey.
- Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished report. State of California, The Resources Agency, Department of Fish and Game, Natural Heritage Division, Sacramento, California.
- Holland, R.F., and S.K. Jain. 1977. Vernal pools. Pages 515-533 *in*: M.G. Barbour and J. Major, eds. Terrestrial Vegetation of California. John Wiley & Sons, New York.
- Holling, C.S. 1973. Resiliency and stability of ecological systems. *Ann. Rev. Ecol. Sys.* 4:1-23.
- Holzman, B.A. 1993. Vegetation change in California's blue oak woodlands 1932-1992. Ph.D. Dissertation, Univ. of Calif., Berkeley.
- Hooper, J.F., and H.F. Heady. 1970. An economic analysis of optimum rates of grazing in the California annual type ranges. *Journal of Range Management* 23:307-311.
- Huschle, G., and M. Hironaka. 1980. Classification and ordination of seral plant communities. *J. Range Management* 33:179-182.
- Hutchings, S.S., and G. Stewart. 1953. Increasing forage yields and sheep production on intermountain winter ranges. U.S. Dept. of Agriculture Circular 925.
- Interagency Ecosystem Management Task Force. 1995. The ecosystem approach: healthy ecosystems and sustainable economics. Vol 1. Council on Environmental Quality, Washington, DC.
- Janes, E.B. 1969. Botanical composition and productivity in the California annual grassland in relation to rainfall. M.S. Thesis, University of California, Berkeley.
- Jenny, H. 1980. The soil resource: Origin and behavior. Springer-Verlag. New York, NY.
- Johnson, W.M. 1953. Effects of grazing intensity upon vegetation and cattle gains on ponderosa pine -- bunchgrass ranges of the front range of Colorado. U.S. Dept. of Agriculture Circular 929.
- Jones, R.D. 1983. Rotomowing antelope bitterbrush -- preliminary report. Proceedings: Research and Management of Bitterbrush and Cliffrose in Western North America. General Technical Report INT-152. U.S. Forest Service Intermountain Forest and Range Experiment Station, Ogden, UT.
- Jordan, Terry G. 1993. North American cattle ranching: frontiers, origin, diffusion and differentiation. University of New Mexico, Albuquerque, NM.
- Kattelman, R., and M. Embury. 1996. Riparian areas and wetlands. Pages 201-273 *in*: Sierra Nevada Ecosystem Project: Final Report to Congress, Vol. III, Chapter 5. Centers for Water and Wildland Resources, Univ. of CA, Davis.

- Kaufmann, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications: a review. *J. Range Management* 37:430-437.
- Keeley, J.E. 1990. The California valley grassland. In: A.A. Schoenherr, ed. *Endangered Plant Communities of Southern California*. Southern California Botanists, Rancho Santa Ana Botanical Gardens, Claremont, CA.
- Kie, J.G., and B.R. Boroski. 1996. Cattle distribution, habitats, and diets in the Sierra Nevada of California. *J. Range Management* 49:482-488.
- Kindschy, R.R., C. Sundstrom, and J.D. Yoakum. 1982. Wildlife habitats in managed rangelands -- The Great Basin of southeastern Oregon: pronghorns. USDA Forest Service, USDI Bureau of Land Management. Gen. Tech. Rpt. PNW-145. 18 pg.
- Kinney, J.W. and W.P. Clary. 1994. A photographic utilization guide for key riparian graminoids. Gen. Tech. Rpt. INT-GTR-308. USDA Forest Service. Intermountain Research Station, Ogden, UT.
- Kondolf, G.M. 1993. Lag in stream channel adjustment to livestock exclosure, White Mountains, CA. *Restoration Ecology* 1:226-230.
- Koniak, S., and R.L. Everett. 1982. Seed reserves in soils of successional stages of pinyon woodlands. *American Midland Naturalist* 108:295-303.
- Küchler, A.W. 1977. The map of the natural vegetation of California. Pages 909-938 in M.G. Barbour and J. Major, eds. *Terrestrial vegetation of California*. John Wiley & Sons, New York.
- Lanner, Ronald. 1981. *The pinon pine: a natural and cultural history*. University of Reno Press, Reno, NV.
- Lassen, R.W., C.M. Ferrel, and H. Leach. 1952. Food habits, productivity and condition of the Doyle mule deer herd. *CA Dept. of Fish & Game* 38(2):211-224.
- Laycock, W.A. 1991. Stable states and thresholds of range condition on North American rangelands: a viewpoint. *J. Range Management* 44:427-433.
- Laycock, W.A. 1994. Implications of grazing vs. no grazing on today's rangelands. In: M. Vavra, W.A. Laycock, and R.D. Pieper, eds. *Ecological Implications of Livestock Herbivory in the West*. Society for Range Management, Denver, CO.
- Laycock, W.A., and P.W. Conrad. 1981. Responses of vegetation and cattle to various systems of grazing on seeded and native mountain rangelands in eastern Utah. *J. of Range Management* 34:52-58.
- Loft, E.R., J.W. Menke, J.G. Kie, and R.C. Bertram. 1987. Influence of cattle stocking rate on the structural profile of deer hiding cover. *Journal of Wildlife Management* 51(3):655-664.

- Longhurst, W., R. Haffenfeld, and G. Connolly. 1981. Deer-livestock interrelationships in the western states. Proc. Symposium Wildlife-Livestock Relationships. Univ. of Idaho. 409-420.
- MacDonald, L.H., A.W. Smart, and R.C. Wissmar. 1991. Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. U.S. Environmental Protection Agency, Water Division: EPA/910/9-91-001. Seattle, WA. 166p.
- Mack, R.M. 1981. Invasion of *Bromus tectorum* L. into western North America: an ecological chronicle. *Agro-ecosystems* 7:145-165.
- Mack, R.N., and J.N. Thompson. 1982. Evolution in steppe with few large, hooved animals. *American Naturalist* 119:757-773.
- MacMahon, J.A. 1980. Ecosystems over time: succession and other types of change. *In*: R.H. Waring, ed. *Forests: Fresh Perspectives from Ecosystem Analysis*, pp. 27-58. Proceedings 40th Annual Biology Colloquium. Oregon State University, Corvallis.
- Manley, P.N., and others. 1995. Sustaining ecosystems, a conceptual framework. Version 1.0. USDA Forest Service, Pacific Southwest Region, San Francisco, CA.
- Manning, M.E., and W.G. Padgett. 1995. Riparian community type classification for Humboldt and Toiyabe National Forests, Nevada and Eastern California. Forest Service Intermountain Region, R4-Ecol-95-01.
- Martin, R.E., and C.H. Driver. 1983.
- Martin, S.C., and D.R. Cable. 1974. Managing semi-desert grass-shrub ranges: vegetation responses to precipitation, grazing, soil texture, and mesquite control. U.S. Dept. of Agriculture Technical Bulletin 1480.
- Mayer, K.E., and W.F. Laudenslayer, eds. 1988. A guide to wildlife habitats of California. State of California, The Resources Agency, Department of Forestry and Fire Protection, Sacramento, California. 166 p.
- Mazer, S. and B. Hendrickson. 1993. Demography and reproductive biology of San Joaquin woolly threads (*Lambertia congdonii*: Asteraceae). Final report to the state of California Department of Fish and Game. Contract # FG 1460.
- McConnell, B.R., and G.A. Garrison. 1966. Seasonal variations of available carbohydrates in bitterbrush. *Journal of Wildlife Management* 30(1):168-172.
- McConnell, B.R., and J.G. Smith. 1977. Influences of grazing on age-yield interactions in bitterbrush. *J. Range Management* 30:91-93.
- McDonald, J.N. 1981. North American bison: their classification and evolution. University of California Press, Berkeley, CA.

- McLendon, T., and E.F. Redente. 1991. Nitrogen and phosphorus effects on secondary succession dynamics on a semi-arid sagebrush site. *Ecology* 72:2016-2024.
- McNaughton, S.J. 1968. Structure and function in California grasslands. *Ecology* 49:962-972.
- McNay, M. and B. O'Gara. 1981. Cattle-pronghorn interactions during the fawning season in northwestern Nevada. *Proc. Symposium Wildlife-Livestock Relationships*. Univ. of Idaho. 593-606.
- Meehan, W.R., F.J. Swanson, and J.R. Sedell. 1977. Influence of riparian vegetation on aquatic ecosystems with particular reference to salmonids and their food supply. Pages 137-145 *in*: R.R. Johnson and D.A. Jones, eds. Importance, Preservation, and Management of Riparian Habitat: A Symposium. USDA Forest Service, GTR-RM-43. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
- Menke, J.W., C. Davis, and P. Beesley. 1996. Rangeland Assessment. Pages 901-972 *in*: Sierra Nevada Ecosystem Project: Final Report to Congress, Vol III, Chapter 22. Centers for Water and Wildland Resources, University of California, Davis.
- Milchunas, D.G., O.E. Sala, and W.K. Lauenroth. 1988. A generalized model of the effects of grazing by large herbivores on grassland community structure. *The American Naturalist* 132:87-106.
- Miller, R.F., J.M. Seufert, and M.R. Haferkamp. 1986. The ecology and management of bluebunch wheatgrass (*Agropyron spicatum*): A review. Station Bulletin 669. Agricultural Experiment Station, Oregon State University, Corvallis.
- Miller, R.F., T.J. Svejcar, and N.E. West. 1994. Implications of livestock grazing in the Intermountain sagebrush region: plant composition. *In*: M. Vavra, W.A. Laycock, and R.D. Pieper, eds. Ecological Implications of Livestock Herbivory in the West. Society for Range Management, Denver, CO.
- Milton, S.J., W.R.J. Dean, M.A. duPlessis, and W.R. Siegfried. 1994. A conceptual model of arid rangeland degradation. *BioScience* 44(2):70-75.
- Modoc County. n.d. Value of grazing permits. Modoc County, Office of the Assessor, Josephine Johnson, Assessor.
- Munz, P.A., and D.D. Keck. 1959. California plant communities. *In*: P.A. Munz. A California Flora. University of California Press, Berkeley, California.
- National Academy of Sciences. 1980. Wild and Free Roaming Horses and Burros: Current Knowledge and Recommended Research. National Academy of Sciences, Committee on Wild Free-Roaming Horses and Burros. Washington, D.C.
- National Research Council, 1994. Rangeland health: New methods to classify, inventory, and monitor rangelands. National Academy Press, Washington, DC.
- Nelson, D., et al. 1994. Foothill riparian. *In*: E. Toth, J. LaBoa, D. Nelson, and R. Hermit, eds. Ecological Support Team Workshop Proceedings for the California Spotted Owl

Environmental Impact Statement. USDA Forest Service, Pacific Southwest Region, San Francisco, CA.

Nevada Dept. of Business and Industry. 1996. Nevada agricultural statistics, 1996. Nevada Department of Business and Industry, Div. of Agriculture. Univ. of Nevada, Reno.

Niering, W.A. 1987. Vegetation dynamics (succession and climax) in relation to plant community management. *conservation Biology* 1:287-295.

Noble, I.R. 1986. The dynamics of range ecosystems. Pages 3-5 *in*: P.J. Joss, P.W. Lynch, and O.B. Williams (eds.) *Rangelands: A Resource Under Siege -- Proceedings of the Second International Rangeland Congress*. Australian Academy of Science. Canberra, Australia.

Noble, I.R., and R.O. Slatyer. 1980. The use of vital attributes to predict successional changes in plant communities subject to recurrent disturbances. *Vegetatio* 43:5-21.

Nord, E.C. 1965. Autecology of bitterbrush in California. *Ecol. Monogr.* 35:307-334.

Odion, D.C., T.L. Dudley, and D.M. D'Antonio. 1990. Cattle grazing in southeastern Sierran meadows: Ecosystem change and prospects for recovery. Pages 277-292 *in*: C.A. Hall and V. Doyle-Jones, eds. *Plant Biology of Eastern California*. White Mountain Research Station, Univ. of CA, Los Angeles.

ORCA & SMGA. 1995. Human powered outdoor recreation -- state of the industry report. Outdoor Recreation coalition of America and Sporting Goods Manufactureres Association's Outdoor Products Council.

ORCA & SMGA. 1997. Human powered outdoor recreation -- state of the industry report. Outdoor Recreation coalition of America and Sporting Goods Manufactureres Association's Outdoor Products Council.

Painter, E.L. 1995. Threats to the California flora: ungulate grazers and browsers. *Madrono* 42:180-188.

Parker, I., and W. Matyas. 1979. CALVEG: a classification of Californian vegetation. USDA, Forest Service, Pacific Southwest Region, Ecology Group, San Francisco, California.

Pechanec, J.F., and G. Stewart. 1949. Grazing spring-fall sheep ranges in southern Idaho. U.S. Dept. of Agriculture Circular 808.

Pickford, G.D., and E.H. Reid. 1948. Forage utilization on summer cattle ranges in eastern Oregon. U.S. Dept. of Agriculture Circular 796.

Pitt, M.D., and H.F. Heady. 1978. Responses of annual vegetation fo temperature and rainfall patterns in northern California. *Ecology* 59:336-350.

Platts, W.S. 1984. Riparian system/livestock grazing interaction research. Pages 413-423 *in*: Warner, R.E, and K.M. Hendrix, eds. 1994. *California Riparian Systems: Ecology*,

Conservation, and Productive Management. University of California Press, Berkeley, CA.

Platts, W.S., and R.L. Nelson. 1985. Streamside and upland vegetation use by cattle. *Rangelands* 7:5-7.

Pollak, O., and T. Kan. (In Press.) The use of prescribed fire to control invasive exotic weeds at Jepson Prairie Preserve. *In: Proceedings, Conference on the Ecology, Conservation, and Management of Vernal Pool Ecosystems*, June 19-21, 1996, Sacramento, CA.

RISC (Range Inventory Standardization Committee). 1983. Guidelines and terminology for range inventories and monitoring. Society for Range Management, Denver, CO.

Rosgen, D.L. 1985. A stream classification system. *In: Johnson, R.R., et al., eds. Riparian Ecosystems and Their Management: Reconciling Conflicting Uses*. 1st North American Riparian Conference. Gen. Tech. Rpt. GTR-RM-120. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station.

Rosgen, D.L. 1993. Overview of rivers in the west. *In: Tellman, B, et al., tech coords. Riparian Management: Common Threads and Shared Interests*. Western Regional Conference on River Management Strategies, Albuquerque, NM. Gen Tech. Rpt. GTR-RM-226. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Ft. Collins, CO. 419 pg.

Rosiere, R. 1987. An evaluation of grazing intensity influences on California annual range type. *J. Range Management* 40:160-165.

Rossiter, R.C. 1966. Ecology of the Mediterranean annual-type pasture. *In: A.G. Norman, ed. Advances in Agronomy*. Academic Press, New York.

Runyan, Dean, Associated. 1994. Campers in California -- travel patterns and economic impacts. Dean Runyan Associates, Portland, Oregon.

Sampson, A.W., A. Chase, and D.W. Hedrick. 1951. California grasslands and range forage grasses. *Calif. Agric. Exp. Sta. Bull.* 724.

Sampson, A.W., and B.S. Jespersen. 1963. California range brushlands and browse plants. CA Agricultural Experiment Station Extension Service Manual 33. Univ. of CA, Berkeley.

Sanderson, Reed H., R.A. Meganck, and K.C. Gibbs. 1986. Range management and scenic beauty as perceived by dispersed recreationists. *J. Range Management* 39(5):464-469.

Sawyer, J.O., and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, Sacramento, California.

Schiffman, P. 1994. Promotion of exotic weed establishment by endangered giant kangaroo rats (*Dipodomys ingens*) in a California grassland. *Biodiversity and Conservation* 3:524-537.

- Schlosser, I.J., and J.R. Karr. 1981. Water quality in agricultural watersheds: Impact of riparian vegetation during base flow. *Water Resources Bulletin* 17:233-240.
- Schnidt, J. and D. Gilbert. 1978. Big game of North America. Ecology and Management. Stackpole Books, Harrisburg, PA. 494 p.
- Schultz, T.T., and W.C. Leininger. 1991. Nongame wildlife communities in grazed and ungrazed montane riparian sites. *Great Basin Naturalist* 51:286-292.
- SCS (Soil Conservation Service). 1976. National range handbook. Soil Conservation Service (now the National Resources Conservation Service), U.S. Dept. of Agriculture, Washington, D.C.
- Shapouri, H., K.H. Matthews, Jr., and P. Bailey. 1993. Cow/calf costs of production, 1990-91. USDA Economic Research Service, Washington, D.C.
- Sheley, R. 1995. Integrated rangeland weed management. *Rangelands* 17(6):222-3.
- Shuman, Todd. 1997. Bovines encroach on Sequoia-Kings Canyon N.P. -- again. In *Wilderness Record*, Vol 22, Number 10. October 1977. California Wilderness Coalition, Davis, CA.
- Skinner, M.W., and B.M. Pavlik. 1994. Inventory of rare and endangered vascular plants of California. California Native Plant Society, Sacramento, CA.
- Skovlin, J.M., R.W. Harris, G.S. Strickler, and G.A. Garrison. 1976. Effects of cattle grazing methods on ponderosa pine -- bunchgrass range in the Pacific Northwest. U.S. Dept. of Agriculture Technical Bulletin 1531.
- Smith, E.L. 1988. Successional concepts in relation to range condition assessment. *In*: P.T. Tueller (ed.). *Vegetation Science Applications for Rangeland Analysis and Management*, pp. 113-133. Kluwer Academic Publishers, Dordrecht, Netherlands.
- Smith, E.L. 1989. Range condition and secondary succession: a critique. *In*: W.K. Laurenroth and W.A. Laycock (eds.). *Secondary Succession and the Evaluation of Rangeland Condition*, pp. 103-141. Westview Press, Boulder, CO.
- SRM (Society for Range Management). 1989. A glossary of terms used in range management, 3rd ed. Society for Range Management, Denver, CO.
- SRM (Society for Range Management) Task Group on Unity in Concepts and Terminology. 1995a. New concepts for assessment of rangeland condition. *J. Range Management* 48:271-282.
- SRM (Society for Range Management) Task Group on Unity in Concepts and Terminology. 1995b. Evaluating rangeland sustainability: the evolving technology. *Rangelands* 17:85-92.
- Standiford, R.B., J. Klein, and B. Garrison. 1996. Sustainability of Sierra Nevada hardwood rangelands. Pages 637-680 *in*: Sierra Nevada Ecosystem Project: Final Report to

Congress, Vol. III, Chapter 22. Centers for Water and Wildland Resources, Univ. of Calif., Davis.

- Stebbins, G.L. 1992. Letter to the editor regarding article by Edwards (1992). *Fremontia* 20:31-32.
- Stevens, L., B. Brown, J. Simpson, and R. Johnson. 1977. The importance of riparian habitat to migrating birds. Pages 156-164 in: R. Johnson and D. Johnes, tech coords, Proc. Importance, preservation and management of riparian habitat: A symposium. USDA Forest Service Gen. Tech. Report RM-43.
- Stone, R.D., W.B. Davilla, D. Wm. Taylor, G.I. Clifton, and J.C. Stebbins. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. Technical report prepared for the U.S. Fish & Wildlife Service, Office of Endangered Species, Sacramento, CA.
- Stromberg, M.R., and J.R. Griffin. 1996. Long-term patterns in coastal California grasslands in relation to cultivation, gophers, and grazing. *Ecological Applications* 6:1189-1211.
- Svejcar, T. and J.R. Brown. 1991. Failures in the assumptions of the condition and trend concept for management of natural ecosystems. *Rangelands* 13:165-167.
- Taylor, D.W. 1989. Status survey for San Joaquin wooly threads (*Lembertia congdonii*). Report prepared for U.S. Fish and Wildlife Service. BioSystems Analysis, Santa Cruz, CA.
- Taylor, D.W. and W.B. Davilla. 1986. Status survey of three plants endemic to the San Joaquin Valley. Report prepared for U.S. Fish and Wildlife Service. BioSystems Analysis, Santa Cruz, CA.
- Thilenius, J.F. 1979. Range management in the alpine zone. Pages 43-65 in: D.A. Johnson (ed.). Special Management Needs of Alpine Ecosystems. Range Science Series No. 5. Society for Range Management, Denver, CO.
- Thomas, J.W., C. Maser, and J.E. Rodiek. 1979. Riparian zones. In: J.W. Thomas, ed. Wildlife Habitat in Managed Forests: The Blue Mountains of Oregon and Washington. Agriculture Handbook 553. USDA Forest Service, Washington, D.C.
- Thomas, J. and D. Toweill. 1982. Elk of North America: ecology and management. Stackpole Books, Harrisburg, PA. 698 p.
- Urness, P.J., and C.H. Jensen. 1983. Goat use in fall increases bitterbrush browse and reduces sagebrush density. Proceedings: Research and Management of Bitterbrush and Cliffrose in Western North America. General Technical Report INT-152. U.S. Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.
- U.S. Bureau of the Census. 1994. 1992 census of agriculture: California. U.S. Department of Commerce, Bureau of the Census. Government Printing Office, Washington, D.C.
- USBEA (Bureau of Economic Analysis). 1996. Regional economic information system. U.S. Department of Commerce, Bureau of Economic Analysis, Washington, D.C.

- USDA, Forest Service. 1997. Fire effects information system. Maintained by the Intermountain Research Station, Fire Sciences Laboratory, Missoula, Montana. Accessible via the World Wide Web at: <http://www.fs.fed.us/database/feis/>
- USFWS (U.S. Fish and Wildlife Service). 1992. Formal Section 7 Consultation Concerning an Interim Program for Livestock Grazing in the Caliente Resource Area, Kern, Kings, Tulare, San Luis Obispo, Santa Barbara, and Ventura Counties, California. U.S. Fish and Wildlife Service, Sacramento, California. Biological Opinion 1-1-92-F-15, January 22, 1992.
- USFWS (U.S. Fish and Wildlife Service). 1993. Notice of review of plant taxa for listing as endangered or threatened. Federal Register 58(188):51144-51190, September 30.
- USFWS (U.S. Fish and Wildlife Service). 1996. Endangered and threatened species, plant and animal taxa; proposed rule. Federal Register 61(40):7596-7613, February 28.
- USFWS (U.S. Fish and Wildlife Service). 1997. Draft Recovery Plan for Upland Species of the San Joaquin Valley, CA. Region 1, USFWS, Portland, OR.
- Vallentine, J.F. 1990. Grazing management. Academic Press, Inc., New York.
- Vallentine, K.A. 1970. Influence of grazing intensity on improvement of deteriorated black grama range. New Mexico Agricultural Experiment Station Bulletin 553.
- Vasek, F.C., and R.F. Thorne. 1977. Transmontane coniferous vegetation. Pages 797-832 in: M.G. Barbour and J. Major, eds. Terrestrial vegetation of California. John Wiley & Sons, New York.
- Vavra, M., W.A. Laycock, and R.D. Pieper, eds. 1994. Ecological Implications of Livestock Herbivory in the West. Society for Range Management, Denver, CO.
- Walker, B.H., D. Ludwig, C.S. Holling, and R.M. Peterman. 1981. Stability of semi-arid savannah grazing systems. J. Ecol. 69:473-498.
- Walmo, O. 1981. Mule and black-tailed deer of North America. Univ. of Nebraska Press. 605 pg.
- Warner, R.E, and K.M. Hendrix, eds. 1984. California Riparian Systems: Ecology, Conservation, and Productive Management. University of California Press, Berkeley, CA.
- West, N.E. 1984. Successional patterns and productivity potentials of pinyon-juniper ecosystems. Pages 1301-1332 in Developing Strategies for Rangeland Management. Westview Press, Boulder, Colorado.
- West, N.E. 1988. Intermountain deserts, shrub steppes, and woodlands. Pages 209-230 in: M.G. Barbour and W.D. Billings, eds. North American Terrestrial Vegetation. Cambridge University Press, New York.

- Wester, L. 1981. Composition of native grasslands in the San Joaquin Valley, California. *Madrono* 28:231-241.
- Westoby, M., B. Walker, and I. Noy-Meir. 1989. Opportunistic management for rangelands not at equilibrium. *Journal of Range Management* 42:266-274.
- Williams, B.L. and B.G. Marcot. 1991. Use of biodiversity indicators for analyzing and managing forest landscapes. *Trans. North American Wildlife and Natural Resources Conf.* 56:613-27.
- Willoughby, J.W. 1989. Rangeland and desert riparian systems: introduction. *In*: D.L. Abell, Technical Coordinator. *Proceedings of the California Riparian Systems Conference: Protection, Management, and Restoration for the 1990's*. U.S. Forest Service General Technical Report PSW-110. Pacific Southwest Forest and Range Experiment Station, Berkeley, CA.
- Willoughby, J.W. 1992. Incorporating new successional theory into the rangeland management program of the Bureau of Land Management. *In*: Brown, J.R., and T. Svejcar (eds.). *Is the Range Condition Concept Compatible with Ecosystem Dynamics?* Symposium Proceedings of Annual Meeting, Society for Range Management, Spokane, WA.
- Willoughby, J.W. 1995. Panel discussion: the future of California's floristic heritage on public lands, moderated by Ken Berg. *Madrono* 42:258-268.
- Young, J.A., R.A. Evans, and J. Major. 1977. Sagebrush steppe. Pages 763-796 *in*: M.G. Barbour and J. Major, eds. *Terrestrial Vegetation of California*. John Wiley & Sons, New York.
- Zedler, P.H. 1987. The ecology of southern California vernal pools: a community profile. *Biological Report* 85(7.11), U.S. Fish & Wildlife Service, National Wetlands Research Center, Washington, D.C.

ANNOTATED BIBLIOGRAPHY

List of References on the Use of Utilization Guidelines and on the Effects of Lower Stocking Rates on the Recovery of Rangelands

The following is an alphabetic listing of research reports and papers dealing with utilization levels for grazing, and the effects of lower stocking rates on rangeland health.

Anderson,C (1995): Overgrazing destroys income-producing rangeland. Grass Roots December 1994-January 1995, 7.

<<"There are many ranchers, that by overgrazing, are destroying their income-producing resource -- their soil and associated plants." "Rainfall records for many years show that while below average years are frequent, nine out of ten years will receive at least 75% of the average rainfall. Most ranchers stock at a constant rate. Why not stock at 75% of what you estimate your stocking rate to be?"

"Think of stocking at 75% as 'rightsizing' of your ranching operation. Large corporations, such as IBM, have downsized their operations recently and have coined the term 'rightsizing.' We Americans have come to believe that more is better. Current trends in industry and government indicate that there is a new awakening that says more is not necessarily better.">>

Anderson,EW (?): Why proper grazing use? J. Range Management, 361-363.

<Proper grazing use is paramount in attaining efficiency of rangeland production. Numerous scientific studies provide the basic reasons for practicing proper use.>

Anderson,JE; Holte,KE (1981): Vegetation development over 25 years without grazing on sagebrush-dominated rangeland in southeastern Idaho. J. Range Management 34, 25-29.

<Data from permanent vegetation transects, established on the Idaho National Engineering Laboratory Site in 1950, were analyzed to determine what changes had taken place in the vegetation complex over the past 25 years in the absence of grazing by domestic livestock. Cover of shrubs and perennial grasses has nearly doubled. Shrub cover in 1975 was 154% greater than in 1950; this change was almost entirely due to increases in cover of big sagebrush between 1957 and 1965. Cover of perennial grasses increased exponentially over the 25-year period, from 0.28% in 1950 to 5.8% in 1975. This was paralleled by significant increases in density and distribution of the four most important grasses on the study area. The 20-fold increase in perennial grass cover has not been at the expense of the shrub overstory. There was no obvious correlation between trends for perennial grass cover and precipitation patterns. Rather, the exponential growth is believed to reflect the availability of seeds as formerly depleted populations increase in size. No evidence of seral replacement, as predicted by classical succession, was found. The data seem more consistent with the "initial floristics/relative stability" concepts of vegetation development.

It is interesting to note that the improvement that was observed was non-linear, with an obvious lag-phase. Little increase in perennial grass cover occurred between 1950 and 1965, at which time the cover began an exponential increase. The authors suggest that the general pattern of recovery on arid rangelands may be a slow change during the first decade or so of rest followed by more rapid revegetation as previously depleted populations build up their size and seed production. Aridity or poor initial condition would tend to lengthen the time before noticeable improvement would be detected.>

Banner,RE; Simonds,G; Hall,RR (1993): A survey on range management effectiveness. Rangelands 15, 40-42.

<Reports on a survey of Society for Range Management members. "The level of achievement of range management effectiveness was rated only 58% on average across all 24 survey issues." "Respondents rated effectiveness on six survey issues at less than 50%: concerned citizen's level of knowledge about range management (Issue 4); the public's view of range practitioners's competence (Issue 6); livestock degradation of riparian areas (Issue 7); private sector range manager's levels of training (Issue 13); levels of range managers' interpersonal skills in communicating and interacting with people (Issue 22); and degree of range management goal sharing by interested people (Issue 18)." Four of these (Issues 4, 7, 18, and 22) were considered by the respondents to be very important to the profession.>

Beale,IF; Orr,DM; Holmes,WE; Palmer,N; Evenson,CJ; Bowly,PS (1984): The effect of forage utilization levels on sheep production in the semi arid south west of Queensland. In: Proceedings of the 2nd International Rangeland Congress. (Eds: Joss,PJ; Lynch,PW; Williams,OB) Cambridge University Press, New York, 30.

<The authors tested the effects of sheep utilization levels of 10, 20, 30, 50, and 80% on animal production per unit area in semi-arid rangelands west of Queensland, Australia. They found that the optimum utilization rate appeared to be about 30%.>

<<An argument for conservative utilization levels on semi-arid rangelands.>>

Beetle,AA; Johnson,WM; Lang,RL; May,M; Smith,DR (1961): Effect of grazing intensity on cattle weights and vegetation at the Bighorn Experimental Pastures. University of Wyoming, Agricultural Experiment Station Bulletin 373. Laramie, Wyoming.

<Reports on a study conducted between 1951 and 1958. On plots with an average utilization ranging up to 40 or 45 percent the production increased during the period. Greatest increases occurred where utilization was the lightest. From these data it is evident that the production of Idaho fescue is related to the intensity with which the plants are utilized. The effect of utilization on production was greater on granitic soils than on sedimentary soils.>

Brunson,MW; Peel,BS (1994): National public attitudes toward federal rangeland management. *Rangelands* 16, 77-81.

<"There is widespread public disapproval of current range policies, reflecting a growing disenchantment with commodity-focused management on public lands as well as a belief that range condition is deteriorating. The public is ambivalent about science and technology--and by extension, the government bureaucrats and resource professionals who seek technological solutions to resource management problems--and mistrustful of the motives of the industry groups that have long been active participants in the management of federal rangelands."

"If the public is unsure about the credibility of the source of information it receives about rangelands, the information is less likely to influence beliefs about range conditions or attitudes toward range management. For example, we found little public confidence in the livestock industry. Ranchers, like others who earn their living obtaining resources from public lands, may be seen as foxes who have been allowed for too long to guard the henhouse. Government-employed range professionals might make a more credible information source than the national cattlemen's or woolgrowers groups, but here, too, some caution should be exercised. In a recent survey of SRM members (Banner et al. 1993), range professionals estimated that the public's view of their professional credibility was only half of what they thought it should be."

"An appeal that emphasizes technological advances may fall on deaf ears, given that half of the public believes society already relies too heavily on technology to solve natural resource problems. More successful appeals are likely to be those that address public preferences for multi-resource management, emphasize non-commodity resources, and acknowledge past mistakes (e.g., riparian management) while pointing to newer resource-friendly policies and practices.">

Burkhardt,JW (1997): Grazing utilization limits: An ineffective management tool. *Rangelands* 19, 8-9.

<Author argues against using utilization limits as a management tool. He notes that grazing does not occur uniformly across the landscape nor throughout the season and that agency managers may inadvertently or intentionally select areas of livestock concentration or areas of special concern and close the allotment based on utilization in these areas.

Also notes that some measure utilization early in the growing season when its impossible to determine total standing crop (and therefore actual annual utilization)--this is more appropriately termed relative use (Frost et al. 1994). Maintains that plant growth during the rest of the growing season makes these early season measurements meaningless both biologically and practically.

Claims that both utilization and stubble height methods are "likely the least effective management tool." Notes that these were developed to manage season-long grazing and that proper season of use and rest are far more effective for dealing with most riparian grazing problems. He gives some management strategies for riparian improvement.>

Clary,WP (1995): Vegetation and soil responses to grazing simulation on riparian meadows. J. Range Management 48, 18-25.

<<10 cm or greater stubble heights appear to be required to ensure full biomass production in mountain meadow sedge communities. "If utilization guidelines are used, those rates that do not exceed 30% of the annual biomass production will likely maintain production the following year." Grazing these communities "once annually to a 5-cm stubble height in the spring, or to a 10-cm stubble height in late summer, or at a utilization rate exceeding 30% of the total annual biomass production can reduce herbage production significantly." The recommendations in this paper apply only to maintaining or enhancing production and do not address the issues of streambank stability and channel maintenance.>>

Cook,CW (1977): Effects of season and intensity of use on desert vegetation. Utah Agricultural Experiment Station, Utah State University, Logan, Utah. Bulletin 483 - Reprinted March 1977.

<Clipping studies were conducted on seven dominant plant species on sagebrush-grass rangelands in western Utah. The species studied were the same as those reported in Cook and Child (1971). 75% defoliation was too severe for all species during all periods in all three phases of study and 50% defoliation was too severe for late spring and summer harvesting. It was concluded that 60% utilization was perhaps too severe for even winter use but 50% utilization in the winter would maintain vigor and sustained yield. 25% utilization was considered more reasonable for late spring and summer use than 30%.>

Cook,CW; Child,RD (1971): Recovery of desert plants in various states of vigor. J. Range Management 24, 339-343.

<Desert plants, when defoliated to the extent that vigor is even moderately reduced, require rather long periods of nonuse for complete restoration. Defoliation in the winter and again in the spring at even moderate intensities was considered deleterious to plant welfare. Late spring harvesting was significantly more harmful to plants than early spring harvesting.

Three browse species (black sagebrush, big sagebrush, and shadscale), two suffrutescent species (winterfat and Nuttall saltbush), and two grass species (Indian ricegrass and squirreltail) were clipped at three intensities (30, 60, and 90 percent of the available herbage) during four periods between 1959-1961. The four periods were winter only (about January 1), winter and again in spring (about January 1 and May 1), early spring only (about April 1), and late spring only (about May 1).

Plants judged to be in lowest vigor in 1962 were those clipped in the winter and again in late spring from 1959 to 1961. The three browse species that were clipped twice a year produced only about 18% as much crown cover as controls in 1962. The two suffrutescent species and Indian ricegrass that were previously clipped twice a year had about two-thirds as much crown cover as the controls in 1962. In 1968 the browse species from these same treatments were producing about 28% as much crown cover as the controls, the suffrutescent species had completely recovered, and grasses had from 55 to 76% recovery for squirreltail grass and Indian ricegrass, respectively.

Clipping only in late spring about May 1 was the second most severe treatment from the standpoint of reduction of vigor of desert forage plants. Past harvesting treatments during the winter only and during early spring only were less detrimental to the welfare of desert forage species than the other treatments.

Rate of recovery within a species was proportional to the state of vigor: the lower the vigor, the less rapid the recovery. It was found that desert plants clipped heavily during any season or harvested even moderately during late spring or twice a year, in winter and again in late spring, still differed significantly in vigor measurements from untreated plants even after seven years of protection.>

<<These findings have serious implications for rest-rotation grazing systems. The assumption that you can graze a species heavily or even moderately (when moderately is 60 percent as in this study) as long as you give it one growing season's rest is incorrect. Rather, proper attention must be given to level of utilization in every grazing period.>>

Cooper,HW (1953): Amounts of big sagebrush in plant communities near Tensleep, Wyoming as affected by grazing treatment. Ecology 34, .186-189

<The author studied big sagebrush-grass rangeland. He concluded that when conservative grazing and occasional resting (deferring) or pastures is practiced on this site, climax grasses can largely replace big sagebrush without artificial aid. Further, under favorable weather and grazing conditions this displacement of big sagebrush by climax grasses can occur in a decade or less.>

Eckert,Jr,RE; Spencer,JS (1987): Growth and reproduction of grasses heavily grazed under rest-rotation management. J. Range Management 40, 156-159.

<The authors report on a study from 1975 to 1984 on a BLM allotment 48 km south of Winnemucca, Nevada. The most widespread community types on the allotment are Wyoming big sagebrush-Thurber needlegrass, Wyoming big sagebrush-bluebunch wheatgrass, and Wyoming big sagebrush-Idaho fescue. A 3-pasture rest rotation grazing system for grazing May through October was initiated in 1973. This system included periodic heavy use during the growing season, as a result of no reduction in stocking rate. The study's objective was to determine the effects of heavy forage use on the basal-area growth and frequency of occurrence of native bunchgrasses with and without sagebrush competition.

The amount of deferment and rest provided by the 3-pasture system was not sufficient to mitigate the effects of periodic overuse. Results of this study strongly implicate periodic heavy grazing during the growing season as a primary cause of restricted basal-area growth and lack of reproduction. These results support the contention that such grazing pressure can prevent range improvement in an otherwise appropriate rotation grazing system.

Management plans implemented without consideration of proper use should be examined and stocking rates adjusted, if necessary, to obtain utilization levels that allow plants of desirable species to respond to proper management.>

<<Another study illustrating the folly of implementing rest rotation grazing systems without using conservative stocking rates.>>

Ellison,L (1960): Influence of grazing on plant succession of rangelands. Botanical Review 26, 1-78.

<Classic paper summarizing the effects of grazing on the different rangelands of the West. Heavy grazing reduces plant species diversity, while moderate, light, or no grazing tends to increase it, except for some humid Great Plains grasslands where moderate grazing appears to increase diversity over the ungrazed situation.>

Frost,WE; Smith,EL; Ogden,PR (1994): Utilization guidelines. Rangelands 16, 256-259.

<The authors discuss the difficulties in measuring utilization at times other than the end of the growing season. If utilization is measured before the end of the growing season, the total peak standing crop cannot yet be known. If utilization is estimated at this time by comparing grazed versus ungrazed areas, it will be overestimated.

The authors also note the difficulty in identifying "current year's growth" for some species, especially on evergreen shrubs. They recommend tailoring utilization guidelines for specific situations (i.e., time of use, what is measured, and how use is measured). They believe timing of grazing to be much more important than the percentage of biomass removed. They recommend a new term, such as relative utilization, be used to express utilization as it is currently being measured. Relative use guidelines can then be developed and tailored to specific situations which are reliable indices for making management decisions.>

Gray,JR (1968): Ranch economics. Iowa State University Press, Ames, Iowa.

<"Conservation of rangeland resources is implied mostly in terms of stocking rates, levels of grazing, or to use a more meaningful term, levels of utilization." "Usually 20 to 30 percent of the current annual growth of the major species present at the range site is considered 'light' grazing; 30-50 percent, 'moderate' grazing; and over 50 percent, 'heavy' grazing." Summarizing the results from 7 experiments in different rangelands, the author concluded that "*The net returns per acre usually are highest when the grazing rate is moderate*" [Emphasis in original.]>

Hart,RH; Clapp,S; Test,PS (1993): Grazing strategies, stocking rates, and frequency and intensity of grazing on western wheatgrass and blue grama. J. Range Management 46, 122-126.

<The authors examined the effects of stocking rates and grazing strategies in effecting change in the botanical composition of rangeland vegetation by altering the frequency and intensity of defoliation of individual plant species. Stocking rates have much greater potential than grazing systems for altering the frequency and intensity of defoliation and subsequent changes in botanical composition of range plant communities. Results of grazing studies support this conclusion.>

<<This paper should alert range managers to pay more attention to proper stocking rates (and grazing intensity, whether measured through residue, stubble heights, or utilization) and not rely on grazing systems alone to solve resource problems.>>

Hart,RH; Samuel,MJ; Waggoner,Jr,JW; Smith,MA (1989): Comparisons of grazing systems in Wyoming. *Journal of Soil and Water Conservation*, 344-347.

<The authors compared short-duration, rotationally deferred, and continuous grazing systems on blue grama-western wheatgrass range in high good condition at the High Plains Grasslands Research Station near Cheyenne, Wyoming. They found that stocking rate and distribution are much more important than rotation in determining the success of a grazing system.>

<<Shows that grazing systems will not compensate for stocking rates that are too high.>>

Heitschmidt,RK; Dowhower,SL; Pinchak,WE; Canon,SK (1989): Effects of stocking rate on quantity and quality of available forage in a southern mixed grass prairie. *J. Range Management* 42, 468-473.

<The authors studied the long-term (25 years) effects of heavy (HC) and moderate (MC) rates of stocking on quantity and quality of forage at the Texas Experimental Range. Quantity of available forage was greater in the MC than the HC treatment. Warm-season short grasses were favored under HC at the expense of warm-season mid grasses. Above ground standing crop was greater in MC than HC. There was greater variation in cow/calf production in the HC than in the MC because forage availability was greater in the latter.>

Heitschmidt,RK; Walker,JW (1996): Grazing management: technology for sustaining rangeland ecosystems. *Rangel. J.* 18, 194-215.

<<"The long-term success or failure of all grazing strategies hinges around management's ability to control the frequency and severity of defoliation of individual plants over time and space." "Grazing management is a social process by virtue of its human component and the major social dilemmas encountered in grazed agroecosystems centers around the impacts that ever-increasing human desires have on rangeland resources."

"...moderately stocked treatment was...more ecologically sustainable than heavily stocked treatment." "Ecological studies in these same treatments showed ecological condition, relative to seral stage, was higher in the MC than HC treatment and ecological trend was steady in MC treatment but declining in the HC treatment." "Thus, based strictly on economics, it can be concluded that the DR treatment was the most sustainable of the four treatments [HC, MC, DR, RC]."

"We believe both moderately stocked treatments (i.e. MC and DR) are socially more acceptable to society at large because they are aesthetically pleasing." Ecological conditions "was fair in the HC treatment and good in all other treatment pastures. Thus, one might conclude that only the HC treatment would not be socially acceptable. But we would suggest that plant species composition does not impact society's acceptance of a given grazing practice nearly as much as amount of standing biomass, ground cover, number of fecal patties, etc.

We would argue, therefore, that neither the heavily stocked HC nor RG treatments would be very socially acceptable since standing crop and ground cover in both were substantially less than in the moderately stocked MC and DR treatments. If true, then it seems reasonable to conclude that current grazing technology requires moderate rates of stocking be employed to insure rangeland agriculture (i.e. grazing) is ecologically sound, economically viable, and socially acceptable."

Note: HC=Yearlong grazing at heavy stocking rates; MC=yearlong grazing at moderate stocking rates; DR=4 pasture, 3-herd deferred rotation grazing treatment stocked at a moderate rate; RG=16-pasture, 1-herd rotational grazing treatment stocked at a very heavy rate.>>

Herbel,CH (1974): A review of research related to development of grazing systems on native ranges of the western United States. Pp. 139-149 in: Plant Morphogenesis as the Basis for Scientific Management of Range Resources; U.S. Department of Agriculture Miscellaneous Publication 1271. Washington, D.C.

<Research studies on grazing systems on native range in the 17 contiguous Western States were reviewed. Year-long continuous grazing was superior to seasonal grazing on the California annual rangelands. There was only limited success with any grazing scheme other than continuous on rangelands grazed only for a part of the year (seasonal ranges). The deferred-rotation system at Sonora, Texas, has resulted in sufficient range improvement to permit a 33-percent increase in stocking as compared to continuous grazing.

Most grazing studies have been established at a fixed stocking rate. Downward adjustments in livestock numbers were made only in severe drought. A fluctuating forage crop was given little thought in establishing grazing studies. This is probably one of the reasons many of the grazing studies have failed to show much improvement in range condition.>

<<This paper shows that stocking rate is likely the overriding factor in determining whether a grazing system works.>>

Holechek,J (1994): Adjusting stocking rate: distance to water and for slope. Western Beef Producer, 6.

<<"Failure to adjust stocking rates for travel distance to water has resulted in considerable range degradation, particularly in the hot, arid rangelands of the southwestern United States. Several studies show cattle make little use of areas more than 2 miles from water."

Livestock performance suffers from having to travel great distances to water. "Research from Australia and on cold desert range in Oregon indicates major reductions in cattle weight gains when the distance exceeds one mile.

"Rugged topography is the second most important cause of poor livestock distribution on rangelands." "Livestock vary considerably in their willingness to use steep terrain. Large, heavy animals such as mature cattle or horses have difficulty in traversing steep rocky slopes. Cattle make little use of slopes over 10%."

Table 1. Suggested reductions in cattle grazing capacity with distances from water: 0-1 miles: No reduction; 1-2 miles: 50%; Over 2 miles: 100%.

Table 2. Suggested reductions in cattle grazing capacity for different slopes: 0-10%: No reduction; 11-30%: 30% reduction; 31-60%: 60% reduction; over 60%: 100% reduction.>>

Holechek,J (1994): Arid rangeland stocking rates: key species considerations. Western Beef Producer, 7-8.

<"Generally when the key species and key area are considered properly used, the entire pasture is considered correctly used. In most cases, one to three plant species are used as key species. These plants should be abundant, productive, and palatable. They should provide the bulk of the forage for grazing animals within the pasture." Key species may differ with type of animal (e.g., blue grama key species for cattle on many New Mexico rangelands, while scarlet globemallow is the key species for antelope on these same rangelands).

"Under the key-species approach, secondary forage species such as muhly and threeawn will receive light use, and key species (blue grama, dropseeds, bluestems) moderate use."

"Heavy use": Range has a "clipped" or mowed appearance. Over half of the fair and poor forage plants are used. All accessible parts of the range show use, and key areas are closely cropped. They may appear stripped if grazing is very severe. There is evidence of livestock trailing to forage. "Moderate use" (proper use): About one-half of the good and fair forage-value plants are used. There is little evidence of livestock trailing. Most of the accessible range shows some use. "Light use": Only choice plants and areas are used. There is no use of poor forage plants. The range appears practically undisturbed.

"On key areas, average stubble heights of 12 to 14 inches for tall grasses, 6 to 8 inches for mid grasses, and 2 to 3 inches for short grasses are recommended minimums."

Note: this summarizes parts of the 1993 Holechek paper, "Managing stocking rates to achieve range resource goals.">

Holechek,J (?): More about using "standards and guidelines" to decide stocking rates. Western Beef Producer, 52.

<"...while there is no substitute for experience in stocking individual ranges, how are range managers to make stocking rate decisions if they don't use some kind of quantitative procedure or guidelines? I have found stocking rate procedures based on utilization, distance from water and slope easy to explain to ranchers, environmentalists and the public at large. No doubt, these guidelines could in some cases result in light use of the range but in all cases they will avoid destructive grazing. If experience shows the range will carry more livestock, they can always be added. However, in arid areas, the effects of a few years of excessive stocking can be difficult to correct.">

Holechek, JL (1988): An approach for setting the stocking rate. *Rangelands* 10, 10-14.

<Summarizes the results of many research studies on utilization levels into a table. Examples are: 25%-35% for salt desert shrubland and true desert (Mojave); 30-40% for semidesert grassland and shrubland; 30-40% for sagebrush grassland; 50-60% for California annual grassland; 30-40% for coniferous forest; 30-40% for mountain shrubland; 30-40% for oak woodland. Ranges in good condition and/or grazed during the dormant season can withstand the higher utilization level, while those in poor condition or grazed during the active growth period should receive the lower utilization level. .

Gives a procedure for determining stocking rate based on knowledge of average forage production over a series of years, or estimates from a single year (paper discusses how to adjust for estimates in good and poor rainfall years--however, reliable estimates are probably not possible if precipitation deviates by more than 50% of the average annual ppt.). Based on the production estimate and the allowable use (obtained from the table discussed above), an initial stocking rate is determined. This stocking rate is then reduced based on percent slope (0-10%: no reduction; 11-30%: 30% reduction; 31-60%: 60% reduction; over 60%: 100% reduction) and distance from water (0-1 mile: no reduction; 1-2 miles: 50% reduction; more than 2 miles: 100% reduction).>

Holechek, JL (1991): Policy changes on federal rangelands: A perspective, or A Wall Street perspective on management of federal rangelands. Invited paper presented to the National Public Lands Advisory Council, November 19, 1991, Holiday Inn, Golden, CO.

Holechek, JL (1992): Financial benefits of range management practices in the Chihuahuan Desert. *Rangelands* 14, 279-283.

<The management strategy that has proven most effective on Chihuahuan Desert rangelands, based on several studies, is to use a conservative stocking rate (30 to 35% use of forage), a continuous grazing system, a maximum watering point spacing of 2 to 3 miles apart, an intensive replacement heifer management program, and intensive breeding program, almost no supplemental feed inputs other than a salt/mineral mix on the mature cow herd, and partial confinement of the herd during periods of severe drought.

The conservative stocking rate is a critical factor in the superior vegetation, livestock, and economic performance on the College Ranch compared to surrounding ranges. Early long-term studies by Paulsen and Ares (1962) on the Jornada Experimental Range and by Valentine (1970) on the College Ranch showed Chihuahuan Desert upland ranges and superior forage productivity under 30 to 40% use levels compared with those that were heavier. Over a 24-year period a combination of continuous grazing and conservative stocking on the College Ranch has tripled forage production, increased range condition from low fair to high good, improved wildlife habitat, and given superior cattle performance. Under this strategy a stocking rate increase of 40% (165 to 120 ac/AU) has been possible with no sacrifice in cattle performance or increase in degree of forage plant use.>

Holechek, J.L. (1993): Managing stocking rates to achieve range resource goals. In: Managing livestock stocking rates on rangeland. Proceedings of a symposium. (Eds: Cox, J.R.; Cadenhead, J.F.) Department of Rangeland Ecology and Management, Texas Agricultural Extension Service, Texas A&M University, College Station, Texas, 10-28.

<Residue is important to protect the soil and to protect key forage plants from extreme temperatures and destruction of growing points in the crown by insects, rodents, and pathogens (Sauer 1978; Sneva 1980). "Heavy defoliation during dormancy reduces herbage production almost as much as during active growth (Cook 1971)." "Ranges managed to maintain critical levels of residue show quicker recovery after the drought than those that have been heavily denuded."

"Heavy stocking rate rapidly decreases forage production in desert areas and gradually reduces forage production in humid ranges. These effects are more reversible and lower in magnitude on humid ranges." Cites Van Poolen and Lacey (1979): based on survey of literature they found average increases of 35% and 27% when continuous livestock use was reduced from heavy to moderate and moderate to light, respectively. "One of the cheapest ways to increase forage production on most ranges is to reduce stocking rate."

Grazing studies in the more humid central Great Plains (Klippel and Bement 1961) concluded most of the improvement in forage production from light grazing occurs during the first five to seven years. "However, on desert ranges the benefits of conservative stocking tend to accumulate and are greatest after a 5- to 10-year period (Holechek 1991). This is because rate of range recovery is strongly associated with amount of rainfall, and therefore, is relatively slow in the desert." "In arid shrubland ranges of the Southwest, light grazing can be a useful means of improving forage production during the early stages of range deterioration if desirable forages are still present but in low vigor. However, light grazing has shown low potential for recovery of highly deteriorated, brush-infested ranges."

Although most stocking rate studies have used percent utilization of forage species to measure grazing intensity, standing crop (dry matter) measurements are the most useful for management decisions. "On year-long ranges most decisions regarding adjustment in stocking rates are made at the end of the growing season in the fall. After the standing crop is estimated, animal numbers can be adjusted so that a minimum residue of dry matter remains just prior to the average time when growth is initiated the following year." Gives guidelines for minimum residues on different Texas range types.

"Generally when the key species and key area are considered properly used, the entire pasture is considered correctly used. In most cases, one to three plant species are used as key species. These plants should be abundant, productive, and palatable. They should provide the bulk of the forage for grazing animals within the pasture." Key species may differ with type of animal (e.g., sideoats grama is a key species for cattle on many Texas rangelands, but the key species for whitetailed deer is live oak on these same rangelands). "Under the key-species approach, secondary forage species such as curly mesquite and threeawn will receive light use, and key species (sideoats grama, Texas winterfat, little bluestem) will receive moderate use."

"Heavy use": Range has a "clipped" or mowed appearance. Over half of the fair and poor forage plants are used. All accessible parts of the range show use, and key areas are closely cropped. They may appear stripped if grazing is very severe. There is evidence of livestock trailing to forage. "Moderate use" (proper use): About one-half of the good and fair forage-value plants are

used. There is little evidence of livestock trailing. Most of the accessible range shows some use. "Light use": Only choice plants and areas are used. There is no use of poor forage plants. The range appears practically undisturbed. "On key areas, average stubble heights of 12 to 14 inches for tall grasses, 6 to 8 inches for mid grasses, and 2 to 3 inches for short grasses are recommended minimums."

Discusses stocking rate adjustments for slope and distance from water. These are the same as given in Holechek 1994 (Citation number 7).

Discusses three methods of setting stocking rate. Found that the Holechek (1988) and Troxel and White (1989) procedures give more reliable stocking rate estimates than the SCS guidelines. Holechek (1988) concluded that in years of average or above average precipitation about 50 percent of the current year's forage production could be consumed by livestock in the more humid ranges (e.g., southern pine forest, tall grass prairie), 40-45% on mid-grass and shortgrass ranges, and 30-35% on desert ranges. Partial or complete destocking is required during droughts (75% or less of average annual ppt.) to avoid breaching critical residues. On most Texas ranges this would be necessary in 3-4 years out of every 10. The Troxel and White (1989) procedure is more conservative. It allocates 25% of current year forage production to livestock, 25% to natural disappearance (insects, wildlife, weathering), and 50% is left for site protection. On most western ranges partial or complete destocking would be necessary in only about 3-4 years out of 20 using this method.>

Holechek, JL (1994): Financial returns from different grazing management systems in New Mexico. *Rangelands* 16, 237-240.

<Moderate (40-45% utilization) continuous grazing appears more profitable and less risky than heavy (utilization 60-65%) continuous grazing or best pasture rotation grazing on shortgrass range in the central mountains of New Mexico. Moderate continuous grazing resulted in fairly stable range condition rated good using the ecological climax approach. Heavy continuous grazing lowered both range condition and forage production compared to moderate continuous grazing.

The best pasture rotational grazing system allowed a 25% higher stocking rate than moderate continuous grazing while improving range condition and increasing forage on the pastures where it was applied compared to moderate and heavy continuous grazing. It was financially unsound on a short term basis (10 years) because of reduced cattle performance and the financing costs associated with extra cattle and fence.>

Holechek, JL (1996): Financial returns and range condition on southern New Mexico ranches. *Rangelands* 18, 52-56.

<"Forage production and financial returns were evaluated over a 7 year period on New Mexico Chihuahuan desert ranches in poor, fair, good, and excellent ecological condition. Both forage production and net financial returns were greatest on excellent condition ranges and lowest on those in poor condition. Maintaining Chihuahuan desert rangelands in high good ecological condition gives a good balance between provision of forage for livestock and maintaining habitat for desirable wildlife. Removal of about one third of the annual production of primary perennial

forage grasses will permit most Chihuahuan desert ranges to improve from fair to high good condition.">

Holechek,JL; Pieper,RD (1992): Estimation of stocking rate on New Mexico rangelands. *Journal of Soil and Water Conservation* 47, 116-118.

<In this study, six stocking rate procedures were compared using long-term data from moderately (sustainably) stocked Chihuahuan desert and shortgrass prairie experimental ranges in New Mexico. Without adjustment for distance from water and for slope, all procedures gave stocking rate estimates much heavier than the ranges actually carried. A quantitative stocking rate procedure that bases guidelines on available research relative to forage utilization, forage intake, adjustment for distance from water, and adjustment for slope underestimated stocking rate by an average of 10%. It appears this procedure can provide reasonable stocking rate estimates for most western U.S. rangelands, providing reliable data are available on the standing crop of the key forage species.

See the abstract for Holechek (1988), An approach for setting the stocking rate, for a discussion of the method.>

Holechek,JL; Stephenson,T (1983): Comparison of big sagebrush vegetation in northcentral New Mexico under moderately grazed and grazing excluded conditions. *J. Range Management* 35, 455-456.

<The authors examined the vegetation inside and outside a 22-year-old exclosure on big sagebrush rangeland near Taos, New Mexico. They found that elimination of grazing had little effect on vegetation composition on the two sites studied. These results are consistent with other studies that show recovery of depleted rangelands is slow to nonexistent in arid environments.>

<<Demonstrates that rangelands in poor condition (i.e., with very few to no perennial grass or forb understory) may have crossed a threshold over which there will be no return without technological inputs.>>

Holechek,JL; Tembo,A; Daniel,A; Fusco,MJ; Cardenas,M (1994): Long-term grazing influences on Chihuahuan Desert rangeland. *Southwestern Naturalist* 39, 342-349.

<Vegetation composition and forage productivity were studied on two Chihuahuan Desert ranges with different management histories. They involved the conservatively grazed New Mexico State University College Ranch, and adjoining intermediately grazed BLM ranges north of Las Cruces in southcentral New Mexico. Conservative and intermediate grazing involved about 30 and 50% average use by livestock of the key forage species, respectively.

Our data indicate that some mesquite-dominated ranges in the Chihuahuan Desert are responsive to both favorable rainfall and conservative stocking if residual perennial grasses remain, and the livestock grazing is sustainable under utilization levels that involve removal of one-third of the current year's growth of key forage species (black grama, dropseeds,

threeawns). On coarse sandy soils with a high canopy cover of honey mesquite, brush control may be necessary to initiate range recovery.>

<<Proper utilization of these rangelands is about 30%, not 50% as practiced on BLM rangelands.>>

Houston,WR; Woodward,RR (1966): Effects of stocking rates on range vegetation and beef cattle production in the northern Great Plains. U.S. Department of Agriculture Technical Bulletin 1357. Agricultural Research Service, Washington, D.C.

<The data on utilization of vegetation by weight showed lower levels of utilization than those in other western range areas commonly associated with maintaining range and livestock productivity. Apparently, under the conditions of this study, the long-term average utilization of both western wheatgrass and needle-and-thread grass should not have exceeded 33 to 37 percent by weight for optimum productivity of the range resource and livestock using it.

The results indicated here on one major site show the most rapid and greatest total-plant growth under the lightest stocking levels. The range-condition classification of 1958 showed the three most heavily stocked pastures on the summer range at about the same reduced level of range condition. However, on the three most lightly stocked summer pastures a rapid increase in range condition with decreased stocking levels was evident.>

Hughes,LE (1982): A grazing system in the Mohave Desert. Rangelands 4, 256-257.

<A grazing system implemented in 1969 in the Beaver Dam Slope Allotment in the Mojave Desert was unsuccessful in improving conditions over a 10-year period at the utilization levels experienced. Allow the 10-year average utilization of the perennial forage was light--around 30 to 35%--the high utilization (above 50%) that occurred in some of the 10 years harmed the desired grasses even when followed with rest from grazing. There is little a manager can do to bring perennial grass back from occasional years of heavy utilization in arid regions.

Managers should look to good management through seasons of use and holding utilization within safe limits--below 50%--on all years.>

Hughes,LE (1990): Twenty years of rest-rotation grazing on the Arizona Strip--an observation. Rangelands 12, 173-176.

<Based on 20 years of observation in the BLM Arizona Strip District, it was found that rest rotation grazing did not result in improvement of key species except where utilization levels in grazed pastures were below 50%. For example, on the Beaver Dam Slope allotment, downward trends were recorded between 1970-1982 at average utilization levels of 36% (range 10-70%), while this same allotment showed an upward trend from 1981-1989 at average utilization levels of 22% (range 11 to 34%).>

Hyder,DN (1951): Grazing capacity as related to range condition. Journal of Forestry 51, 206.

<The author concluded that on sagebrush-bunchgrass range in southeastern Oregon that "although 50 percent utilization is generally considered to be moderate, it probably represents excessive cropping on the range under consideration because of the large proportion of poor and fair range condition.>

<<An argument for utilization levels in the neighborhood of 30-40% for most sagebrush-grass rangelands.>>

Jasmer,GE; Holechek,JL (1984): Determining grazing intensity on rangeland. Journal of Soil and Water Conservation January-February, 32-35.

<Reviews different methods of estimating utilization, residue, and stubble heights. Recommends using residue and stubble heights instead of utilization to evaluate grazing intensity. Two advantages of residue (including stubble height) methods are 1) managers can be trained much more easily to estimate residue visually than to estimate percent use, and 2) grazing intensity data between years and locations are more comparable.

Although guidelines concerning minimum residue and stubble heights are not available for most range types, they probably could be determined from the literature available. Guidelines already exist for the California annual grassland type (500 to 2500 pounds per acre, depending on site, Bartolome et al 1981, Hooper and Heady 1970), for blue grama range in Colorado (300 pounds per acre, Bement 1969), and for big sagebrush range in southeastern Oregon (160 pounds per acre, Hyder 1953).

Best means of evaluating grazing intensity for ranchers and others who must make routine management decisions may well be a general reconnaissance procedure. Ocular estimates of herbage residue are accurate and repeatable if the observer has some previous training. Where quantitative residue data are required, the best procedure appears to be the weight-estimate-by-plot method of double sampling.>

<<Excellent review of literature on measuring utilization>>

Johnson,WM (1953): Effect of grazing intensity upon vegetation and cattle gains on ponderosa pine-bunchgrass ranges of the front range of Colorado. U.S. Department of Agriculture Circular 929. Washington, D.C.

<Reports on a study conducted in central Colorado in an area representative of ponderosa pine ranges in the Front Range of the Rocky Mountains. The average herbage production increased on the moderately and lightly grazed grassland and was maintained on the moderately and lightly grazed open timber. In contrast, average herbage production decreased greatly in both the grassland and open timber on areas that received heavy grazing. Light grazing=10-20% of grass and sedge herbage removed; moderate grazing=30-40%; heavy grazing=50% or more>

Klipple,GE; Bement,RE (1961): Light grazing--is it economically feasible as a range improvement practice? J. Range Management 14, 57-62.

<The authors examine the results of 3 studies and conclude that light grazing is a cost-effective range improvement strategy for livestock operators and managers, especially on ranges that have not become depleted. They note, however, that light grazing alone cannot improve rangelands where competing undesirable vegetation dominates.>

Klipple,GE; Costello,DF (1960): Vegetation and cattle responses to different intensities of grazing on short-grass ranges in the central Great Plains. U.S. Department of Agriculture Technical Bulletin No. 1216. Washington, D.C.

<Reports on a study conducted from 1940 to 1953 on the Central Plains Experimental Range in northeastern Colorado. All four pastures under heavy grazing dropped two or more grades in range condition from 1942 to 1953. Two of the four pastures under moderate use held the same grade, while the other two improved two grades in range condition. All four light-use pastures improved in range condition. Heavy use=about 60% by weight of current growth grazed by end of the 6-month grazing season; moderate use=about 40%; light use=about 20%.

60% utilization was too heavy, either for maintaining satisfactory range condition or making best gains by the cattle. With 40% utilization, ample forage was available to maintain the cattle in thrifty condition all season. Production by the dominant grasses was maintained, highly palatable plants usually survived, and the general condition of the range was maintained or improved. Where less than 30% was grazed, cattle had access to surplus forage at all times. Highly palatable species like needle-and-thread and winterfat increased in frequency of occurrence and dominant grasses increased in vigor and yield.>

<<The summary includes comments of the appearance of the range under different utilization levels>>

Lacey,JR; Van Poolen,HW (1981): Comparison of herbage production on moderately grazed and ungrazed western ranges. J. Range Management 34, 210-212.

<The authors examined the results of 20 published grazing studies to see whether there was a difference between the total amount of herbage produced on ungrazed as opposed to moderately grazed Western ranges. They found that herbage production averaged 68 +/- 46% higher when plots were protected from a moderate level of livestock grazing. Herbage production of individual plants averaged 59 +/- 50% higher when they were protected, rather than clipped at a moderate level of use. This contradicts several published opinions that moderate grazing is beneficial when compared to no grazing.>

Lang,RL; Barnes,OK; Rauzi,F (1956): Shortgrass range: grazing effects on vegetation and sheep gains. Vol. Bulletin 343. Wyoming Agricultural Experiment Station, Laramie, Wyoming.

<Reports on a 10-year grazing study, conducted between 1945-1954 on native shortgrass range in southeastern Wyoming. Principal objectives were to determine the effects of 3 degrees of

forage utilization on the botanical composition of the vegetation and the pounds of gain per head and per acre on sheep. Criteria for degree of utilization were average leaf heights of blue grama: 1.2 inches=lightly used; 0.9 inches=moderately utilized; 0.6 inches=heavily grazed. The four major grass species (blue grama, buffalograss, western wheatgrass, and needleandthreadgrass) responded differently to grazing pressure. Blue grama decreased on the ordinary upland site but increased on the slope site under heavy grazing. Buffalograss increased on the ordinary upland and dry bottom sites of the heavily utilized pastures but remained about constant on the slope site. Western wheatgrass responded to grazing pressure by decreasing on all sites. Needleandthreadgrass, which was abundant only on the slope site, was practically eliminated by 10 years of heavy use.

Leaving an average leaf height of 1.2 inches on blue grama at end of each growing season (light utilization) resulted in minor changes in vegetational composition. Utilizing the range to an average of 0.68 inch leaf height of blue grama (heavy utilization) resulted in drastic changes in vegetational composition after 10 years.

Ten years of protection from grazing resulted in a decrease of percentage composition contributed by blue grama and needleandthreadgrass and an increase in western wheatgrass on the slope site. Forbs in the exclosures increased to approximately 25 percent of the total basal cover at close of this study. They were never abundant in the grazed areas during the 10 years of study.>

Launchbaugh,JL (1967): Vegetation relationships associated with intensity of summer grazing on a clay upland range site in the Kansas 20- to 24-inch precipitation zone. Vol. Technical Bulletin 154. Agricultural Experiment Station, Kansas State University of Agriculture and Applied Science, Manhattan, Kansas.

<Summarizes results of a 20 year study of summer grazing by yearling cattle. Utilization averaged 66, 47.5, and 38.8 percent under heavy, moderate, and light grazing, respectively, during the last 10 years of the experiment.

Total herbage production was greatest under light grazing and differences among all treatments were significant. Composition of herbage yield was associated with stocking rate. Buffalograss production was greatest under heavy grazing and lowest under light grazing. Blue grama and western wheatgrass both produced most under light grazing and least under heavy grazing.>

Laycock,WA (1967): How heavy grazing and protection affect sagebrush-grass ranges. J. Range Management 29, 206-213.

<The author found that heavy late-fall sheep grazing following spring deferment improved deteriorated sagebrush-grass range by reducing sagebrush and increasing the production of grasses and forbs. It is important to note, however, that the sagebrush on the range studied is three-tip sagebrush (*Artemisia tripartita*) and not the much more common big sagebrush. Three-tip sagebrush is much more palatable than big sagebrush; the results of this study should not, therefore, be extrapolated to big sagebrush-grass ranges.>

Laycock,WA; Conrad,PW (1981): Responses of vegetation and cattle to various systems of grazing on seeded and native mountain rangelands in eastern Utah. J. Range Management 34, 52-58.

<This study compared several grazing systems in an allotment on the Ashley National Forest in Utah. On the native sagebrush-grass range, which was in fair to good condition and grazed at a moderate intensity, rest-rotation was not a better system than summer-long grazing. Utilization during this study was less than 40%.>

Lewis,JK; Van Dyne,GM; Allsee,LR; Whetzel,RW (1956): Intensity of grazing. Vol. Bulletin 459. Animal Husbandry Department, Agricultural Experiment Station, South Dakota State College, Brookings, South Dakota.

<Studied grazing on western South Dakota range from 1942-1955 and concluded that "a utilization of the annual forage production of between 30 and 45 percent from May 1 to December 1 would result in maximum sustained livestock production consistent with maintaining the soil and vegetative resources.>

Martin,SC; Cable,DR (1964): Managing semidesert grass-shrub ranges: Vegetation responses to precipitation, grazing, soil texture, and mesquite control. U.S. Department of Agriculture, Forest Service Technical Bulletin No. 1480.

<Reports on a 10-year study on the Santa Rita Experimental Range near Tucson, Arizona. Mean annual precipitation is 13 inches. Distances up to 1 mile from water did not greatly reduce utilization by cattle on the relatively level, rock-free study area. Utilization 1/4 mile from water averaged 48 percent compared to 44 and 43 percent at 5/8 and 1 mile, respectively. Perennial grass intercept and herbage production held up best where utilization was lightest. Average utilization substantially greater than 40 percent was consistently detrimental to perennial grasses>

McCormick,J; Galt,H (1993): Forty years of vegetation trend in southwestern New Mexico. In: Vegetation management of hot desert rangeland ecosystems; symposium proceedings. University of Arizona, Tucson, Arizona, 68-79.

McKinney,E (1997): It may be utilization, but is it management? Rangelands 19, 4-7.

<Notes the problems associated with the measurement of utilization. Average utilization along transects tell us nothing about impacts to the individual plants. For example an average utilization of 51% would result from a transect with 6 plants heavy ($6 \times 70\% = 420$), 1 plant moderate ($1 \times 50\% = 50$), 1 plant light ($1 \times 30\% = 30$), 1 plant slight ($1 \times 10\% = 10$), and 1 plant unused ($1 \times 0\% = 0$). The conclusion would be that the area was grazed at a moderate level, even though only one plant was actually grazed at this level.

Maintains that overgrazing does not occur after the grazing animal makes one visit to the plant; it occurs after a revisit to the plant before it has had a chance to regrow. He gives another example of a transect on which 4 plants were grazed to the severe level, 2 plants heavy, and 4

plants ungrazed, which results in an average of moderate, even though 40% of the plants are severely grazed.>

<<The problems the author notes with respect to averaging utilization values can be overcome either by using the *median* rather than the mean (in which case both of his examples would come out to be heavy utilization) or by taking into account the percentage of the total number of plants of the key species that have any level of grazing (see Holechek 1993; Valentine 1970).>>

Miller,RF; Donart,GB (1979): Response of *Bouteloua eriopoda* (Torr.) Torr. and *Sporobolus flexuosus* (Thurb.) Rydb. to season of defoliation. J. Range Management 32, 63-67.

<Authors looked at the effects of defoliation by clipping in different seasons on black grama (*Bouteloua eriopoda*) and mesa dropseed (*Sporobolus flexuosus*) on the New Mexico College Ranch near Las Cruces. Black grama plants clipped during or after flowering, or continuously through the growing season, produced less herbage in the following year than those plants clipped during the vegetative state. Removal of 65% of the current year's growth any time during the growing season significantly reduced stolon numbers on black grama. Mesa dropseed clipped during maturity, during flowering, or clipped continuously throughout the growing season was negatively affected on one or more of the plant parameters measured. Clipping during the vegetative state had little apparent effect on plant vigor. Both species were unable to tolerate continuous clipping at 65% herbage removal.>

Miller,RF; Donart,GB (1981): Response of *Muhlenbergia porteri* Scribn. to season of defoliation. J. Range Management 34, 91-94.

<Removing 65% of the leaf area of bush muhly (*Muhlenbergia porteri*) in three consecutive years during the growing season reduced plant vigor regardless of the season of clipping. Late or continuous season defoliation had the greatest impact on food reserves, production, crown diameter and number of stem internodes. Defoliation during the vegetative stage had the least effect of the clipping treatments, but this is likely because only 30% of the total season's growth was removed under this treatment. The authors conclude that to maintain stands of bush muhly, utilization must be below 65%, *especially if grazing is occurring after flowering*. [Emphasis added.]>

<<The important point of this study is that attention must be paid to proper utilization, even if this occurs during the "dormant" season.>>

Mueggler,WF (1975): Rate and pattern of vigor recovery in Idaho fescue and bluebunch wheatgrass. J. Range Management 28, 198-204.

<The rate and pattern of vigor recovery of protected individual Idaho fescue (*Festuca idahoensis*) and bluebunch wheatgrass (*Agropyron spicatum*) were studied for 5 years after heavy and extreme clipping. The removal from heavy clipping approximated 50% removal of the total herbage weight. Bluebunch wheatgrass was not only more sensitive to clipping, but recovered more slowly than Idaho fescue. Idaho fescue of moderately low vigor required approximately 3

years and bluebunch wheatgrass a projected 6 years to approach normal vigor. Recovery from very low vigor may take more than 6 years of protection for Idaho fescue and 8 years for bluebunch wheatgrass.

Maximum leaf length can be used as a reliable index of Idaho fescue vigor. Flower stalk numbers combined with maximum lengths indicate vigor in bluebunch wheatgrass.>

<<Paper shows that you can't count on grazing systems with one or even two years rest to compensate for overutilization of these two key species.>>

Paulsen,HA,Jr; Ares,FN (1962): Grazing values and management of black grama and tobosa grasslands and associated shrub ranges of the Southwest. U.S. Department of Agriculture, Forest Service Technical Bulletin No. 1270. Fort Collins, Colorado.

<Summarizes research conducted on the Journada Experimental Range from 1916-1953. Conservative grazing removes up to 40 percent of the herbage; intermediate use removes between 40 and 55 percent of the herbage; heavy grazing removes more than 55 percent. Recovery of black grama was greatest on quadrats conservatively grazed>

Pearson,HA (1973): Calculating grazing intensity for maximum profit on ponderosa pine range in northern Arizona. J. Range Management 26, 277-278.

<Reports on a study from 1963-1967 in a ponderosa pine range near Flagstaff, Arizona. Concluded that the range producing 500 lbs forage per acre is grazed most economically at 30% utilization and range producing 1000 lb forage per acre is grazed most economically at 38% utilization. Both of these grazing intensities on Arizona fescue-mountain muhly range would be considered moderate and would not adversely affect long-term forage production.>

Pechanec,JF; Stewart,G (1949): Grazing spring-fall sheep ranges of southern Idaho. U.S. Department of Agriculture Circular No. 808. Washington, D.C.

<The authors found that the best management strategy on sagebrush-grass rangelands is conservative stocking. They note: "By fall the [perennial grass] plants are mature and less susceptible to injury than in spring. They can stand heavier use. *Even so, fall grazing must be conservative.* [Emphasis added.] The herbage left after spring grazing provides for the production of plant foods needed to maintain vigor, produce seed, and support early growth the following spring. The herbage left in the fall protects the root crown of herbaceous species against cold during the winter.

The authors note that sheep operators cannot vary livestock numbers rapidly and widely enough to meet the extreme fluctuations in herbage and forage production and that the best recourse is to maintain a nearly constant rate of stocking that is low enough to provide adequate forage in all but extreme drought years. With this level of stocking about 50 to 60% of the herbage of finer grasses will be left after spring grazing, and 30 to 40% will be ungrazed at the end of the fall season. Only about 40-50% of the herbage of wheatgrasses will be utilized at the end of fall.>

<<Note the need for conservative utilization even in the "dormant" season, in order to leave residue that will protect the root crowns of perennial grasses from freezing. The authors recommend conservative utilization levels at all times of year.>>

Peck,C (1994): Carrying capacity on arid rangelands. Western Beef Producer, 1 and 6.

<Summarizes views of Jerry Holechek on stocking rates. Heavy stocking rapidly decreases the forage production capability of ranges in desert areas. "One of the cheapest ways to increase forage production on most ranges is to reduce stocking rate." "On a Chihuahuan desert range in New Mexico, for example, forage production increased from 160 pounds per acre to over 600 pounds during a 25-year period under conservative stocking (30% use of key forages)." "Grazing studies in the more humid central Great Plains concluded most of the improvement in forage production from light grazing occurs during the first five to seven years. However, on desert ranges the benefits of conservative stocking tend to accumulate and are greatest after a 5- to 10-year period." "In arid shrubland ranges of the Southwest, light grazing can be a useful means of improving forage production during the early stages of range deterioration if desirable forages are still present but in low vigor. However, light grazing has shown low potential for recovery of highly deteriorated, brush-infested ranges."

Note: this summarizes part of the 1993 Holechek paper, "Managing stocking rates to achieve range resource goals.">

Peck,C (1994): Stocking rate strategies and the economy. Western Beef Producer, 7.

<"In arid areas, flexible stocking has minor advantages over constant stocking at a conservative rate. This is because forage crops vary more between years due to erratic rainfall, carry-over residue plays a bigger role in meeting livestock nutritional needs, and there is greater risk of long term damage to the range if maximum stocking and drought coincide.">

Peck,C (1994): Residue important in stocking rate decisions. Western Beef Producer, .

<<Most stocking rate studies have used percent utilization of forage species to measure grazing intensity. But standing crop measurements are more useful for making management decisions according to Holechek. "Holechek noted that heavy stocking causes desirable wildlife species such as pronghorn, prairie chickens and wild turkeys to decline or disappear since inadequate vegetation is available to meet their cover and food needs."

Low residue makes the soil more vulnerable to wind and water erosion. "Many ranchers and range professionals held the belief residue was unimportant to forage plants after completion of growth." Research, however, has shown residue during dormancy is critical in protecting plants from extreme temperature destruction of the growing points in the crown, from insects, rodents, and pathogens. "Heavy defoliation during dormancy cuts production almost as much as during active growth."

Note: this summarizes parts of the 1993 Holechek paper, "Managing stocking rates to achieve range resource goals.">>

Peck,C (?): Range "standards" and "guidelines" not the same. Western Beef Producer, 12.

<Summarizes concerns of Bill Laycock with utilization and stubble height guidelines. While these may be appropriate for broad guidelines, Laycock says they're inappropriate as standards to be applied by agencies. Responding to Holechek's stubble height guidelines for key species (12-14 inches for tall grasses, 6 to 8 inches for mid grasses, and 2 to 3 inches for short grasses) Laycock says "even as a guideline the mid-grass height is not appropriate for drier sites. Leaves of mid grasses very often do not grow six to 8 inches height. Only the flowering stalk, which contains little of the weight, may reach this height. Thus a National Forest or BLM district picking up these heights as 'standards' would limit use of mid grasses to only 10 or 15% of their weight." According to Laycock, "management" includes water and salt distribution, riding, etc. and focusing too much on stocking rate leads to inappropriate utilization limits, complicated formulas to predict utilization, and all of the other things that are not managing the range but "policing" the range.>

Pickford,GD; Reid,EH (1948): Forage utilization on summer cattle ranges in eastern Oregon. U.S. Department of Agriculture Circular No. 796. Washington, D.C.

<Authors caution that attention must be paid to the utilization of the key forage species. While only 23 percent of the total herbage in the study area was grazed by the end of the grazing season, important forage grasses like bluebunch wheatgrass and prairie junegrass were utilized 60% and 55%, respectively, levels that are "as fully as considered safe.">

Pieper,RD; Heitschmidt,RK (1988): Is short-duration grazing the answer? Journal of Soil and Water Conservation 43, 133-137.

<The authors summarize literature on impacts of livestock grazing, grazing systems in general, and short duration grazing in particular. They find the claims for "hoof actions" benefits to be untrue and that impacts from grazing animals to be the same under short duration grazing as under other grazing systems. Monitoring grazing intensity is critical whether rangelands are under grazing systems or not.

The authors state: "What is the surest way to halt range deterioration and enhance conservation of this valuable resource? Disregarding any economic considerations, destocking is the quickest, surest, and most viable way to reduce current deterioration trends wherever they are occurring."

They further state: "Neither of us are advocating total and continued rest: that is unnatural as well. Instead, we are suggesting that stocking rate is and always will be the major factor affecting the degradation of rangeland resources. No grazing system can counteract the negative impacts of overstocking on a long-term basis.>

Potter,LD; Krenetzky,JC (1967): Plant succession with release from grazing on New Mexico rangelands. J. Range Management 20, 145-151.

<After 25 years of protection from grazing, grassland plots tripled in percent of ground cover of grasses. Grazed desert grasslands showed continued increases in mesquite. Protection resulted in remarkable increases in grass cover in ponderosa pine and aspen types.>

Rhoades,ED; Locke,LF; Taylor,HM; McIlvain,EH (1964): Water intake on a sandy range as affected by 20 years of differential cattle stocking rates. J. Range Management 17, 185-190.

Sauer,RH (1978): Effect of removal of standing dead material on growth of *Agropyron spicatum*. J. Range Management 31, 121-122.

<Standing dead material was clipped from clumps of bluebunch wheatgrass (*Agropyron spicatum*), with no other disturbance. Clumps without dead material, compared to those with, had less green material and shorter leaves but did not differ in height or number of flowering culms or head lengths. Standing dead appears to be beneficial to bluebunch wheatgrass.>

<<Another paper indicating that attention must be given to proper utilization levels even in the "dormant" season.>>

Sharp,L; Sanders,K; Rimbey,N (1994): Management decisions based on utilization--is it really management? Rangelands 16, 38-40.

<The authors do not believe that using utilization data is an appropriate management tool. They cite difficulties in measuring utilization, variability of utilization levels on bluebunch wheatgrass from 69% to 38% and on crested wheatgrass of 29% to 89% with no apparent harm to the range, and the difficulties in setting proper use levels.

Instead of time consuming utilization measurements, the authors recommend taking photographs of the range at various times during the year; these can be used to evaluate both utilization and range trend. They recommend supplementing the photographs with weather data, actual use records, and field notes on insect, rodent, and wildlife activity.>

<<Because crested wheatgrass is much more resistant to grazing than most native range grasses, data on its ability to cope with high utilization levels cannot be extrapolated to native grasses. They cite articles by Caldwell (1984) and Menke (1987) as evidence of the difficulty in setting proper use levels. These papers, however, especially Menke's, were responding to then recent attempts, primarily BLM's through the SVIM process, to determine carrying capacities on rangelands by assigning proper use factors to a host of different plant species occurring on the same range site. As currently employed, utilization levels are set for individual key species (often just one at any key area, but sometimes two or three), not for all of the plants simultaneously. The criticisms of Caldwell and Menke are therefore not applicable to utilization guidelines being applied by land management agencies in 1997.>>

Shoop,MC; McIlvain,EH (1971): Why some cattlemen overgraze--and some don't. J. Range Management 24, 252-257.

<Cattle can make high gains on overgrazed range for a few years--if they are fed enough hay, grain, or protein. The supplements mask the low and declining production of overgrazed range. This combination of overgrazing and extra supplements can be profitable until the plant and soil

resources are badly damaged, or until a series of drouth years combined with low or dropping cattle prices "terminate" the business or put it on a subsistence level.

Over the long term, moderate grazing is more profitable than overgrazing, and in the short term, is much more stable financially.>

Sims,PL; Singh,JS; Lauenroth,WK (1978): The structure and function of ten western North American grasslands. I. Abiotic and vegetational characteristics. *Journal of Ecology* 66, 251-258.

Skovlin,J (1987): Southern Africa's experience with intensive short duration grazing. *Rangelands* 9, 162-167.

<"...evidence in literature from Zimbabwe and elsewhere in southern Africa indicates that it is impossible to have both heavy stocking and improvement in range condition. In fact, studies of SDG involving 12-16 units at only medium rates of stocking have shown no greater improvement than conventional systems." "The assumption that stocking rate or level of vegetative use is unimportant if an appropriate rotational system is employed is flawed." "Emphasis on SDG from southern Africa is now away from high stocking rates to accomplish non-selective grazing with preference toward higher animal performance." Note: SDG=short duration grazing.>

Skovlin,JM; Harris,RW; Strickler,GS; Garrison,GA (1976): Effects of cattle grazing methods on ponderosa pine-bunchgrass range in the Pacific Northwest. (U.S. Department of Agriculture, Forest Service Technical Bulletin No. 1531)

<Heavy stocking lowered grazing capacity, depleted ground cover, reduced cattle gains, and limited game use. Moderate stocking maintained grazing capacity, provided acceptable cattle gains, and slightly lowered the amount of high quality forage. Light stocking provided a substantial increase in capacity and the best cattle gains per head but not per acre; it permitted the highest game density under dual use. Protection from cattle use slightly improved the composition of high quality forage species, produced little change in potential grazing capacity, furnished no marketable product, but provided the greatest game use.

Average utilization varied by species. Two examples from the grassland site follow. Bluebunch wheatgrass: light use was 34% under both season-long and deferred rotation; moderate use was 49% and 41% under season-long and deferred rotation, respectively, and heavy use was 55% and 50% under season-long and deferred rotation, respectively. Sandberg bluegrass was 7% and 8% (light), 16% and 11% (moderate), and 21% and 17% (heavy) under season-long and deferred rotation, respectively.>

Smith,DA; Schmutz,EM (1975): Vegetative changes on protected versus grazed desert grassland ranges in Arizona. *J. Range Management* 28, 453-458.

<The authors studied protected and grazed rangelands in southeastern Arizona. They classed the grazed range in a low stage of range condition and the protected range in an intermediate

stage. They concluded that without a change in treatment and management, mesquite would continue to increase on both ranges.>

Smith,DR (1967): Effects of cattle grazing on a ponderosa pine-bunchgrass range in Colorado.. Technical Bulletin 1371. U.S. Department of Agriculture, Forest Service, .

Smoliak,S (1974): Range vegetation and sheep production at three stocking rates on Stipa-Bouteloua prairie. J. Range Management 27, 23-26.

<The author reports on a study from 1951-1969 on *Stipa comata-Bouteloua gracilis* prairie at the Agriculture Canada Research Substation in Alberta. Three levels of grazing, heavy, moderate, and light, were applied to the range, which was grazed for 9 months each year. Range deterioration and poor livestock performance resulted from heavy grazing. The author concluded that this range should be stocked at not less than 1.0 acre per ewe per month to maintain the vegetative cover in a productive condition. This corresponds to a moderate rate of utilization (average of 53% over the 18-year period.>

Sneva,FA (1980): Crown temperature of Whitmar wheatgrass as influenced by standing dead material. J. Range Management 33, 314-315.

<The impact of standing dead material on the crown temperature, yield, and crude protein concentration of Whitmar wheatgrass (*Agropyron inerme*) was studied. During the day standing dead material significantly lowered temperature in the crown but influenced temperatures during the night only slightly. Herbage yield of new growth was greater and its crude protein concentration lower on plots with than without standing dead material.>

<<Another paper showing the importance of standing dead material to plant vigor. Implications are that attention must be paid to proper utilization even in the "dormant" season.> >

Taylor,CA,Jr; Ralphs,MH; Kothmann,MM (1997): Technical note: Vegetation response to increasing stocking rate under rotational stocking. J. Range Management 50, 439-442.

<The authors report on a 10-year study on the Texas Agricultural Experiment Stations near Sonora, Texas. The objective was to evaluate vegetation response to increasing stocking rates under rotational stocking (3 days graze, 51 days rest) and long-term rest. The 4 stocking rate treatments ranged from the recommended rate for moderate continuous grazing to 2.7 times the recommended rate. Common curly-mesquite (*Hilaria belangeri*) increased in all grazed treatments and decreased in the livestock exclosure. Sideoats grama (*Bouteloua curtipendula*) along with other midgrasses decreased in all grazed treatments and increased in the livestock exclosure.

Because the midgrasses were palatable species and not abundant, they were defoliated too intensively and too frequently. Rotational stocking was not able to sustain initial species composition at any of the stocking rates tested.

Even though rotational stocking methods have been claimed to improve or maintain range condition, range managers must be alert when implementing rotational stocking on semi-arid rangelands. Increasing the density and production of preferred plants is a difficult and slow process. The presence of competing vegetation and the influence of precipitation, soil type, and intensity and frequency of grazing results in variable responses to stocking methods.

For rotational stocking to be successful, we recommend monitoring of grazing use on preferred plants. Range managers must then adjust both grazing methods and animal numbers to maintain proper use on key forage species. [Emphasis added.]>

<<Must still monitor proper utilization, regardless of whether there is a grazing system in place, and make adjustments as necessary in animal numbers and grazing methods.>>

Thurow,TL; Blackburn,WH; Taylor,CA (1988): Infiltration and inter-rill erosion responses to selected livestock grazing strategies, Edwards Plateau, Texas. J. Range Management 41, 296-302.

<The authors examined the effects of 4 types of grazing on infiltration rate and inter-rill erosion: moderate continuous grazing (MCG); heavy continuous grazing (HCG); high-intensity, low-frequency grazing (HILF), moderately stocked; and short duration (SDG) and heavily stocked.

The MCG and HILF pastures were able to recover from droughts and maintain initial infiltration rates and inter-rill erosion. In contrast, infiltration rates decreased and inter-rill erosion increased on HCG and heavily stocked SDG pastures. The heavy stocking rate and climate rather than grazing strategy were the primary factors influencing the hydrologic responses. Litter was important both to promote infiltration and to protect against rill erosion.>

Trlica,MJ; Buwai,M; Menke,JW (1977): Effects of rest following defoliations on the recovery of several range species. J. Range Management 30, 21-26.

<Seven important forage species were heavily defoliated once to remove 90% of the foliage during each of four different phenological stages. The effects of these defoliations were evaluated in the fall, 2 years after the defoliated plants had received 14 to 26 months of rest. Western wheatgrass, little rabbitbrush, and scarlet globemallow made good recovery after a single defoliation followed by 14 to 26 months of rest. A 14 to 26 month rest period was insufficient for complete recovery of antelope bitterbrush and fourwing saltbush. The rest period was insufficient for recovery of herbage yield of blue grama, except when the defoliation was made during the quiescence phenological stage. The rest period was also insufficient for recovery of fringed sagewort; the 90% defoliation was extremely severe for this species and several years of nonuse would be required for its recovery.

The authors also looked at the effects of 3 and 6 heavy defoliations to these species. See paper for results.>

<<This paper provides evidence that a single year's rest is likely insufficient to provide for recovery of many forage plant species.>>

Troxel,TR; White,LD (1989): Balancing forage demand with forage supply. Texas Agricultural Extension Service Publication B-1606. Texas A&M University. College Station, Texas.

<Range research has determined that on a year-long average properly stocked livestock harvest only 25%of the forage produced, commonly referred to as a harvest efficiency of 25 percent. This means that 25 percent of the forage is consumed by livestock, 25 percent is lost to natural disappearance and 50 percent must remain in the pasture for soil protection and future forage production.>

Valentine,KA (1970): Influence of grazing intensity on improvement of deteriorated black grama range. New Mexico Agricultural Experiment Station Bulletin 553. Las Cruces, New Mexico.

<Reports on an experiment conducted on the New Mexico Agricultural Experiment Station Ranch from 1953-1964. Although the percentage of weight of current herbage grazed, a measure of utilization, is often used among professional range managers, it is more direct and often more meaningful for management purposes to recognize levels of use in terms of stubble height and seedstalks remaining after grazing. These characteristics have to do directly with maintenance and reproduction of the plants and protection of soil. These can be evaluated effectively in a qualitative (visual) manner.

Light and moderate use of black grama plants 18 to 20 inches high results when stubble heights are about 5-6 inches and 3-4 inches, respectively. Under light and moderate levels of use on the range, where large numbers of the plants are present, cattle do not use the plants to uniform stubble height. Instead, light and moderate use involves full, or nearly full, proper use of the plants which are grazed and light or no use of the remaining plants. Thus, light use would result from grazing about one-third of the plants in a stand to full, proper use and leaving the remaining two-third ungrazed. Moderate use would result from grazing about two-thirds of the plants and leaving one-third ungrazed.

Plant vigor was significantly greater under light and moderate use than under "proper" and heavy use. Under light and moderate use, an average of 38 percent of the cover and 45 percent of the yield of black grama on good-condition range was attained; under proper and heavy use, the averages were only 26 percent of the cover and 22 percent of the yield of black grama on good-condition range.>

Vallentine,JF (1990): Grazing management. Academic Press, Inc., New York.

<Gives percent utilization guidelines (which he calls "suggested proper use factors") adapted from Holechek (1988). Suggested proper use factors are 25-35% for southern desert shrublands; 30-40% for northern desert shrublands, semidesert grass and shrublands, sagebrush-grasslands, and oak woodland and chaparral; 35-45% for western mountain grasslands, shrublands, and coniferous forest; and 50-60% for California annual grassland (only those relevant to California are included in this summary).

He also gives categories for utilization (slight=1-20%; moderate=21-40%; full=41-60%; close=61-80%; severe=81-100%) and discusses the use of residue in lieu of utilization. Summarizes

Holechek's (1988) findings with respect to residue: 300 pound/acre satisfactory on Colorado short-grass range, 160 pound/acre grass residue on Oregon big-sagebrush-grass ranges, and 250-1,100 pound/acre in California annual grassland type, depending on the site.>

Van Poolen,HW; Lacey,JR (1979): Herbage responses to grazing systems and stocking intensities. J. Range Management 32, 250-253.

<The authors reviewed data from studies previously conducted throughout the West and looked at the increase in herbage production as a result of implementation of grazing systems and of reductions in stocking rate. Utilization levels were defined as follows: Heavy=60-80%; Moderate=40-60%; light=20-40%. They found that mean annual herbage production increased by 13% when grazing systems were implemented at a moderate stocking rate. Increases were larger (35% and 27%) when continuous livestock use was reduced from heavy to moderate, and moderate to light, respectively. This suggests that land managers should place more emphasis on proper stocking intensity and less on grazing system implementation.>

<<Stocking rates (and utilization levels) are more important than grazing systems in increasing herbage production.>>

Wolfshohl,K (1996): More beef with less stress. Grass Roots September-October, 2 and 8.

<<Summarizes experience of Spade Ranches in arid West Texas and eastern New Mexico, which produces twice as much beef on some of its divisions as it grew 20 years ago. Each ranch uses a 4-pasture rest-rotation grazing system, but pays special attention to stocking rate. During drought "the secret is not to wait too long to decrease the stock and not to be overstocked anytime. We watch our forage and never go by the condition of our animals. If you do, you've waited too long.">>

Woolfolk,EJ (1949): Stocking northern Great Plains sheep range for sustained high production. Vol. Circular 904. U.S. Department of Agriculture, Washington, D.C.

Yorks,TP; West,NE; Capels,KM (1992): Vegetation differences in desert shrublands of western Utah's Pine Valley between 1933 and 1989. J. Range Management 45, 569-578.

<In 1989 the authors repeated (with some modifications) a transect first conducted in 1933 in southern Pine Valley, Utah. Vegetation included a low rabbitbrush type, a spiny hopsage type, and a sagebrush type. Each segment of the transect includes a mixed understory of grasses and forbs.

Changes in rangeland vegetation integrate the consequences of livestock grazing intensity and possible climatic change, as well as other factors. This study showed substantially greater understory cover as a relative proportion of total plant cover occurred in 1989 in all vegetation types examined. Both overall cover and relative cover of perennial grasses increased greatly between 1933 and 1989. While the total number of species is more or less unchanged, more of the species in all three vegetation types are playing an appreciable role.

The changes are attributable to reductions in grazing pressure, both numbers and season of use. The authors state "Such an increase in perennial grasses is encouraging in the Pine Valley area, where desertification was reported to have been an obvious process....This change is especially notable because it occurred on land that received no substantial treatment subsequently, except reduction--not elimination--of domestic grazing pressure. This remains true even if the increase was the partial result of threshold influences of precipitation (Laycock 1991).>

<<This paper shows that improvement can occur from decreases in grazing pressure, even in areas that such improvement wouldn't have been predicted,>>

Yorks,TP; West,NE; Capels,KM (1994): Changes in pinyon-juniper woodlands in western Utah's Pine Valley between 1933-1989. J. Range Management 47, 359-364.

<In 1989 the authors repeated a transect originally run in 1933 through pinyon-juniper communities. They found that significantly greater shrub and perennial grass covers (more than threefold increases) were found in 1989, even where overall dominance is still by pinyon-juniper. Although the total number of species is more or less unchanged, the clear indication from examination of dominance/diversity is that more species are playing an appreciable role, as so could serve as a set of buffers against specialized environmental pressures.

When the increases in perennial grass cover is combined with increases in understory forbs, "the differences which were observed in Pine Valley can only be held as strong evidence that in at least on publicly owned area, improvement in condition has indeed occurred, and that this is concurrent with changes in livestock management (i.e., reductions in pressure in both length of seasons of use and in absolute numbers of animals, but not in their elimination) which followed the Taylor Grazing Act of 1934.">

<<This paper shows that improvement can occur from decreases in grazing pressure, even in areas that such improvement wouldn't have been predicted without such practices as chaining or fire.>>

GLOSSARY

Accelerated Erosion: Soil loss above natural levels resulting directly from human activities.

Active Preference: The number of AUMs available to be grazed (authorized on a grazing permit or lease).

Activity Plan: A detailed and specific plan for management of a single resource program to achieve specific objectives undertaken only when needed to implement the more general Land Use Plan decisions (e.g. allotment management plan for livestock grazing or habitat management plan for wildlife habitat).

Age Class: An age interval, usually with a 10 to 20 year span, into which a vegetative area is classified (e.g. a 80-100 year old stand of bitterbrush).

Allotment: An area of land designated and managed for the grazing of livestock by one or more livestock operators. It generally consists of public lands, but may include parcels of private or State owned lands.

Allotment Categorization: As an aid to prioritize grazing allotments for development of management plans, BLM has placed all allotments into one of three categories: improve (I), maintain (M), or custodial (C).

Allotment Management Plan: A written plan for livestock grazing management, including supportive measures if required, designed to attain specific multiple use management, sustained yield, economic and other goals in a grazing allotment.

Alluvial Plain: A former floodplain, typically composed of several layers or terraces of sediment at different elevations and of different ages -- the higher the elevation, the older the age.

Alluvium: An accumulation of sediments deposited by streams or rivers.

AUM (Animal Unit Month): The amount of forage necessary to support 5 sheep, or 1 cow and her calf, for one month.

Biological Diversity (biodiversity): The distribution and abundance of different plant and animal species and communities within an area.

Biomass: The total amount of living plants and animals above and below the ground in an area at a given time.

Browse: (1) the part of shrubs, half shrubs, woody vines, and trees available for animal consumption; or (2) to search for or consume browse.

Capability: The potential of the land to produce goods and services under a set of management practices and at a given level of management intensity. Depends on site conditions (such as climate, soils, geology), political, social, or economic constraints, as well as applications of management practices.

Catastrophic Event: A large scale, high intensity natural disturbance that occurs infrequently (e.g. flood, fire).

Channel: A waterway that contains moving water either periodically or continuously. A channel has a definite bed and banks.

Channel Form and Function: Pertaining to the natural form and function of a waterway with definite bed and banks in a particular area; specifically, channel gradient, pool frequency, width to depth ratio, roughness, sinuosity, and other characteristics play a role in the dissipation of stream energy during high water flows, sediment transport and capture, and other stream channel functions.

Common rooting depth:

Community: An aggregation of cultural or biological units having relationships that are mutual with the environment and with each other; an assemblage of species at a particular time and place.

Connectivity: A network of habitat patches linked by areas or corridors of like habitat; it affects how organisms can move through the landscape.

Criteria to Meet Standard: Pertaining to the indicators used in the determination of the degree to which the condition of the land is consistent with the Standards for Rangeland Health and the Fundamentals of Rangeland Health.

Deferred Grazing: A grazing system where use is postponed until a later (more appropriate) time (waiting for green-up or seed-drop, etc.).

Deferred Rotation: Deferred grazing, but in a system of pastures where the deferred use is rotated between the pastures on a yearly basis (one year one pasture will receive deferred use, the next another, . . .).

Deposition: The settlement of material out of water and onto the stream or lake bed (opposed to erosion); accumulation of eroded materials around plants or in small basins; as sediment in alluvial fans, gullies, streams, lakes; or as dunes.

Desired Beneficial Use: The use of water that is deemed beneficial and desirable; guidance for making determinations is contained in the Clean Water Act (Federal), Executive Order 12088, Porter-Cologne Act (California), Clean Water Act (Nevada), and a Memorandum of Understanding between the California Water Resources Control Board, BLM, and others.

Desired Condition: Land or resource conditions which are expected to result if planning goals and objectives are fully achieved. Formerly this was called "desired future condition".

Desired Future Condition: The future condition of rangeland resources on a landscape scale that meet management objectives. Desired future condition is based on ecological (such as desired plant community), social, and economic considerations during the land and resource planning process. Desired future condition is usually expressed as ecological status of vegetation (species composition, habitat diversity, age, and size classes of species) and desired soil qualities (conditions of soil cover, erosion, compaction, loss of soil productivity).

Desired Plant Community: The plant community that has been determined through a land use or management plan to best meet the plan's objectives for the site.

Diversity: Physical, biological, or cultural variety.

Ecosystem Elements: The basic building blocks of ecosystems. There are three fundamental types of ecosystem elements: **components** are the kinds and numbers of organisms and physical attributes that make up the ecosystem -- the "pieces"; **structures** refer to spatial distribution or pattern of these "pieces"; and **processes** refer to the flow or cycling of energy, materials, and nutrients through space and time.

Edge/Edge Effect: Areas where two physical or biological zones meet. The increased diversity in these areas is known as the edge effect.

Energy Flows: Pertaining to the flow of energy through an ecosystem; usually described as an "energy pyramid." The rates of energy flow can vary on rangelands in both space and time. An example of energy flow is -- sunlight energy is captured and converted into carbohydrates by green plants (producers) through photosynthesis; deer (primary consumers) eat the plants; coyotes (secondary consumers) eat deer; and eagles (tertiary consumers) eat coyotes.

Erosion: Detachment and movement of soil from the land by wind, water, or gravity.

Exotic Species: A species of plant or animal that is not native to the area where it is found. Any species that is not indigenous, native, or naturalized.

Facultative: Having the capacity to live under more than one specific set of environmental conditions, as an animal or plant that can live in either a wetland or upland environment (opposed to obligate).

Field Office: This is the new designation of local BLM offices. With recent reorganization of BLM in California, some of the structural hierarchy was eliminated. Within the EIS area, there are no more District Offices over-seeing Resource Area offices. All of the offices have been designated as Field Offices with a Field Manager in charge.

Floodplain: An alluvial plain caused by the overbank deposition of alluvial material. Typically appearing as flat expanses of land bordering a stream or river. Most floodplains are accompanied by a series of alluvial terraces of varying levels.

Forage: Browse and herbage which is available and can provide food for animals or be harvested for feeding.

Forb: (1) Any herbaceous plant other than those in the Gramineae (true grasses), Cyperaceae (sedges), and Juncaceae (rushes) families - i.e. any non-grasslike plant having little or no woody material on it; or (2) a broad-leaved plant whose above ground stem does not become woody or persistent.

Fragmentation: Process of reducing the size and connectivity of vegetated stands and/or habitat that comprise a rangeland or forest; a measure of connectivity in vegetative and/or habitat conditions across a landscape.

Fundamentals of Rangeland Health: As described in 43 CFR 4180; the conditions in which rangelands are in properly functioning physical condition, ecological processes are supporting healthy biotic populations and communities, water quality is meeting State standards and BLM objectives, and Special Status Species habitat is being restored or maintained.

Guidelines for Livestock Grazing: Livestock grazing management tools, methods, strategies, and techniques designed to maintain or achieve healthy public lands; as defined by the Standards for Rangeland Health.

Habitat: Natural environment of a plant or animal.

Habitat Requirements: Pertaining to the biological and physical components of the environment that are required to meet the needs of a plant or animal.

Herbaceous: Vegetation with little or no woody component; non-woody vegetation such as grasses and forbs.

Herbage: The above ground material of any herbaceous plant (grasses and forbs).

Indicator: Quantitative measure of an ecosystem element which is used to describe the condition of an ecosystem; changes in indicators over relatively short periods of time are used to measure effects of management.

Key Area: A relatively small portion of land selected, based on its location, use, or grazing value, as a location for monitoring the effects of grazing use. It is assumed that key areas, if properly selected, will reflect the effects of current grazing management over all or a part of a pasture, allotment, or other grazing unit.

Key Ecosystem Elements: A distinct subset of ecosystem elements. They are the elements over which management and society have an influence. They form the basis for evaluating the effects of management on ecosystem sustainability.

Key Species: (1) Species that, because of their importance, must be considered in a management program; or (2) forage species whose use shows the degree of use of associated species.

Landscape (Scale): An area of interacting ecosystems where patterns are repeated because of geology, landform, soils, climate, biota, and human influences throughout the area. Applied in terms of 100's to 1000's of acres.

Monitoring: The collection of information to determine the effects of resource management and to identify changing resource conditions or needs.

Native (indigenous) Species: A species of plant or animal that naturally occurs in an area and that was not introduced by humans.

Non-Use: AUMs that are normally available for use, but are not grazed through either the permittee's or BLM's request.

NorCal East: The area formerly designated as the Susanville District of BLM, currently consisting of the Surprise, Eagle Lake and Alturas Resource Areas; the area covered by the Susanville RAC.

NorCal West: The area formerly designated as the Ukiah District of BLM, currently consisting of the Arcata, Clear Lake and Redding Resource Areas; the area covered by the Ukiah RAC.

Nutrient Cycle: Circulation of chemical elements, such as carbon or nitrogen, in specific pathways from the non-living (abiotic) parts of the environment into the organic substances (plants and animals), and then back again into abiotic forms.

Obligate: Restricted to a particular set of environmental conditions. (opposed to facultative).

Objective: A measurable description of a desired future condition that specifies what is to be accomplished, location, and timeframe.

Original Use: The use of water in effect at passage of the 1978 amendments to the Federal Clean Water Act.

Patch: A small (20-60 acre) part of rangeland or forest; an area of vegetation that is internally homogeneous, differing from the vegetation that surrounds it.

Pedestaling: The occurrence of plants or rocks on pedestals means that the soil has eroded away from the base of the plant or rock and it has become slightly elevated above the eroded surface of the soil. The height of the pedestals and the degree of root exposure can serve as indicators of the degree of soil loss.

Perennial Stream: A stream that flows throughout the year for many years.

Permeability Rate (soil): The rate at which gases, liquids (water), or plant roots penetrate or pass through a bulk mass of soil or a layer of soil.

Plant Community: Assemblage of plant populations in a defined area or physical habitat; an aggregation of plants similar in species composition and structure, occupying similar habitats over the landscape.

Population Structure: The number of males and females in various age classes.

Potential: The highest ecological status an area can attain given no political, social, or economic constraints; often referred to as the potential natural community.

Potential Natural Community (PNC): The biotic community that would become established on an ecological site if all successional sequences were completed without human interference under present environmental conditions. Natural disturbances are inherent in its development. The PNC may include acclimatized or naturalized non-native species (SRM 1989). A particular site is classified as being in the PNC seral stage if it is 76% or more similar in plant species composition to the PNC that has been described for the site (see Table 3.3.3 for more information).

Prescribed Fire (Prescribed Burn): A controlled wildland fire ignited by humans under specified conditions, to accomplish specific, planned resource objectives. This practice is also known as "controlled burning".

Prescribed Natural Fire: A wildland fire ignited by natural causes such as lightning or volcanism. They are allowed to burn in designated areas under conditions carefully planned to provide for safety and control of the fire.

Properly Functioning Condition (Riparian-wetlands): Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid in floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is influenced by land form, soil, water, and vegetation.

Properly Functioning Condition (Uplands): Uplands are functioning properly when the existing vegetation and ground cover maintain soil conditions capable of sustaining natural biotic communities. The functioning condition of uplands is influenced by land form, soil, water, and vegetation.

Public Lands: Those tracts of land owned by the people of the United States, that are administered by the Bureau of Land Management (BLM).

Reach: A continuous unbroken stretch of a stream with homogeneous characteristics; a section of stream between two tributaries of that stream.

Recruitment: Addition to a plant or animal population from all sources, including reproduction, immigration, and stocking.

Residual Mulch Level: The amount of vegetation left at the end of the grazing season.

Residual Plant Cover: Standing herbaceous vegetation that has cured and become decayed. When these plants fall, they become litter.

Resource Advisory Council (RAC): A group established pursuant to 43 CFR 1780 and other authorities to advise BLM on resource management issues.

Resource Area: This is the local, on-the-ground BLM management unit. With recent reorganization of BLM in California, these areas are now called Field Offices.

Rest: Leaving an area ungrazed, thereby foregoing grazing of one forage crop. Normally rest implies absence of grazing for a full growing season or during a critical portion of plant development.

Rest-Rotation: A grazing system with several pastures, one of which receives no grazing use during a year. Each year, a different pasture is rested.

Riparian: The transition area between an aquatic ecosystem and an adjacent terrestrial ecosystem identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

Scale: The degree of resolution used in observing and measuring ecosystem processes, structures and changes over space and time.

Scour Erosion: The removal of a fairly uniform layer of soil or materials from the land surface by wind.

Season of Use: The time during which livestock grazing is permitted on a given area, as specified in the grazing permit and/or terms and conditions.

Section 3 and Section 15 Grazing Allotments: These designations refer to either Section 3 or Section 15 of the Taylor Grazing Act. Under the Act, grazing permits were issued for Section 3 allotments, which were in grazing districts; leases were issued for primarily small isolated parcels surrounded by private lands outside of federal grazing districts (Section 15). Under the Act, grazing receipts are apportioned differently to the counties depending upon the type of allotment.

Sediment Entrapment: A key element of stream channel form restoration; the deposition and retention of sediment in streams with sufficient riparian vegetation present at or below the bank top to successfully entrap and retain sediment during runoff.

Seeps: Groundwater discharge areas. In general, seeps have less water flow than a spring.

Seral Stage (State): Pertaining to the successional stages of biotic communities. One of a series of biotic communities that follow one another in time on any given ecological site (See Succession).

Sheet Erosion: The removal of a fairly uniform layer of soil or materials from the land surface by rainfall or runoff water.

Sinuosity: Pertaining to the curves, bends, or turns in watercourses.

Soil (Ground) Cover: The percentage of material, other than bare ground, covering the land surface. It may include live vegetation, standing dead vegetation, plant litter, cobble, gravel, stones, and bedrock.

Soil Productivity: Capacity of a soil to produce biomass through plant growth.

Special Status Species: Plant or animal species listed as endangered, threatened, candidate, or sensitive by Federal or State governments.

Species: A fundamental category of plant or animal classification.

Species Richness: Number of species, either in total or by some grouping scheme.

Standards for Rangeland Health: A description of conditions needed to sustain public land health; relates to all uses of the public lands.

Structural Diversity: The variety of the composition, abundance, spacing, size, and other attributes of plants in a community.

Structure: Patterns of association (vertical, horizontal, or temporal) among ecosystem elements; e.g. plant communities, including the growth habits, life forms, and distribution of the species.

Stubble Height Threshold: The specified minimum height (amount) of herbaceous vegetation required to be present in a given area after the livestock grazing period.

Succession: The constantly occurring process of community change; it is the sequence of communities that replace one another in a given area over time; e.g. progressive development of vegetation after a fire (bare ground) towards its highest ecological expression, the climax community (old growth conifer).

Suitability: Appropriateness of applying certain management practices to or allowing certain uses in a particular area of land.

Suitable Habitat: The biological and physical components necessary to meet some or all of the needs of a species.

Suspended Non-Use: AUMs withdrawn from authorized use; may potentially be re-authorized for use if range conditions improve.

Sustainability: The ability to maintain diversity, productivity, resilience to stress, health, renewability, and yields of desired values, resource uses, products, or services over time in an ecosystem while maintaining its integrity.

Technical Review Team: As described in 43 CFR 1784; a group formed by the Resource Advisory Council (RAC), BLM, or a RAC local team to gather and analyze data and develop recommendations to aid the decision making process.

Terms and Conditions: The provisions and stipulations specified by the BLM as a part of a livestock grazing permit or other land use authorization.

Transition Period: The period of time between completion and adoption of these standards and guidelines and their being placed in operational effect at the individual grazing permit terms and conditions level.

Upland: Land at a higher elevation than the alluvial plain or low stream terrace; all lands outside the riparian-wetland and aquatic zones.

Utilization: The proportion of a year's forage production that is consumed or destroyed by grazing animals.

Vegetation (Plant) Community: An aggregation of plants similar in species composition and structure, occupying similar habitats over the landscape.

Vegetation Corridors: See connectivity.

Vegetation Type: A plant community with distinguishable characteristics.

Viable populations: Populations of plants and/or animals that persist for a specified period of time across their range despite normal fluctuations in population and environmental conditions.

Vigor (Plant): Pertaining to characteristics such as a mix of plants with normal growth on the basis of height, color, seed production, rhizome and stolon production, and annual biomass production.

Wetlands: An area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions.

Woody Riparian Species: Plant species consisting of wood such as trees, shrubs, or bushes found in riparian-wetland areas.

APPENDIX A -- COMMENT LETTERS RECEIVED FOR DRAFT ENVIRONMENTAL IMPACT STATEMENT

This appendix contains the entire text of the comment letters received by BLM on the Draft EIS on Rangeland Health Standards and Guidelines for California and northwestern Nevada. The first two pages is an index of the letters received, showing the number assigned to the letter, and the date of receipt.

The pages following the index contain the actual letters. BLM has read through each letter and identified those portions of the letters that made a statement or suggestion, or requested a response. These comments were then numbered consecutively within each letter. BLM has responded to these individual comments in Chapter 5, Sections 5.4.1 and 5.4.2.

LETTER NUMBER	PARTY COMMENTING	DATE RECEIVED
1.	CALIFORNIA CATTLEMEN'S ASSOCIATION	7-9-97
2.	ANIMAL PROTECTION INSTITUTE	6-26-97
3.	NEVADA DEPARTMENT OF BUSINESS & INDUSTRY	7-3-97
4.	W.A. LAYCOCK, UNIV OF WYOMING	7-18-97
5.	CARL TWISSELMAN	8-4-97
6.	LAHONTON REGIONAL WATER QUALITY BOARD	8-11-97
7.	BILL PHILLIPS	8-6-97
8.	TULARE COUNTY BOARD OF SUPERVISORS	8-20-97
9.	BOB WILSON	8-22-97
10.	CALIFORNIA TROUT	8-22-97
11.	JERRY L. HOLECHEK, NEW MEXICO STATE UNIV	8-22-97
12.	MODOC COUNTY BOARD OF SUPERVISORS - 2 LTRS	8-22-97
13.	THE REVEG EDGE, CRAIG DREMANN	8-25-97
14.	MATOLE LANDOWNERS FOR SENSIBLE WTRSHD MGT	8-25-97
15.	JACK BOOTH	8-25-97
16.	NATIONAL RESOURCE DEFENSE COUNCIL and CALIFORNIA NATIVE PLANT SOCIETY	8-28-97
17.	AMADOR COUNTY BOARD OF SUPERVISORS	8-28-97
18.	SISKIYOU COUNTY BOARD OF SUPERVISORS - 2 LTRS	9-4-97
19.	LASSEN COUNTY BOARD OF SUPERVISORS	8-28-97
20.	DON P. MULLALLY	8-28-97
21.	SHIRLEY MURRER	8-28-97
22.	SVEINN ERIK OLAFSON	8-28-97
23.	CITY OF SAN DIEGO METRO. WASTEWATER DEPT.	8-29-97
24.	ROBERT SCHLUTER	8-29-97
25.	ELIZABETH L. PAINTER	9-1-97
26.	PAULA SCHIFFMAN	8-31-97
27.	REGION 9 ENVIRONMENTAL PROTECTION AGENCY	9-2-97
28.	STATE OF NEVADA CLEARINGHOUSE	9-2-97
29.	ORGANIZED SPORTSMEN OF LASSEN COUNTY	8-31-97
30.	GLENN COUNTY BOARD OF SUPERVISORS	8-29-97
31.	CALIFORNIA FARM BUREAU FEDERATION	8-29-97

32.	CALIFORNIA MULE DEER ASSOCIATION	8-29-97
33.	STATE WATER RESOURCES CONTROL BOARD	9-2-97
34.	CALIFORNIA DEPARTMENT OF FISH AND GAME	9-2-97
35.	SHASTA COUNTY BOARD OF SUPERVISORS - 5 LTRS	9-2-97
36.	ROGER PETERSON	9-2-97
37.	RONALD L. SCHLUTER	9-2-97
38.	CENTRAL COAST REG. WATER QUALITY CONTROL BRD.	9-2-97
39.	WILLY HAGGE	9-2-97
40.	NELSON RANCHES	9-2-97
41.	GEORGE BAILEY, JR.	9-2-97
42.	MODOC COUNTY CATTLEMEN'S ASSOCIATION	9-2-97
43.	McGARVA RANCH	9-3-97
44.	JOHN ESPIL SHEEP CO., INC.	9-4-97
45.	UKIAH RESOURCE ADVISORY COUNCIL	9-5-97
46.	LASSEN COUNTY FARM BUREAU	9-5-97
47.	CENTRAL VALLEY REG. WATER QUALITY CONTROL BRD.	9-8-97

CALIFORNIA CATTLEMEN'S ASSOCIATION

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Letter # 1, page 1

RAISING THE CATTLE
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July 7, 1997

Bureau of Land Management
California State Office
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Sacramento, CA 95825

Attn: Rangeland DEIS

To Whom It May Concern:

The California Cattlemen's Association appreciates the opportunity to provide comments on the "Rangeland Health Standards and Guidelines for California and Northwestern Nevada" Draft Environmental Impact Statement (DEIS), published in May 1997. We have a number of concerns and suggestions that we believe should be addressed in the final document and decision notice.

The California Cattlemen's Association (CCA) represents California's beef cattle producers on local, state and federal legislative and regulatory issues. With over 3,100 members statewide, CCA represents the vast majority of the ranchers who hold grazing permits and leases on the Bureau of Land Management (BLM) lands covered by the DEIS.

1-1 [The National Environmental Policy Act (NEPA) requires agencies to analyze the direct and cumulative impacts of proposed actions. While this DEIS in most cases sufficiently analyzes the direct impacts, it fails to analyze the cumulative impacts of this and other actions (including the federal Endangered Species Act, PACFISH, etc.).

While CCA remains concerned about the potential for the Resource Advisory Councils (RACs) mandated by Rangeland Reform '94 to be dominated by interests opposed to grazing on federal lands, we are supportive of the process undertaken in California for ensuring balance on these councils. Furthermore, while we will outline below our concerns with the standards and guidelines developed by each California RAC, we are supportive of the process by which these standards and guidelines were developed. With modification, CCA supports Alternative 1 as the preferred alternative.



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FEEDER COUNCIL VICE CHAIRMAN
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Finally, CCA compliments grazing permittees and BLM for two-plus decades of improved resource conditions on California's federal rangelands. Our members are committed to the long-term sustainability of rangeland resources, and both research and anecdotal evidence demonstrate considerable progress in range management over the last 20 years. Cooperation is the cornerstone of this success, and we encourage BLM to implement these new standards and guidelines in a manner which enhances this spirit of cooperation.

The following comments are organized by chapter.

Chapter 1: Introduction

1-2 Any effort to improve rangeland health must include both an analysis of current conditions and of the causes of any documented unhealthy conditions. Changing grazing management will obviously not improve unhealthy rangelands if the condition is caused by roads, recreation, wild horses and burros, or other multiple uses. While CCA understands that the DEIS addresses standards and guidelines for grazing only, the document should indicate in stronger terms that grazing management will not be changed where it is already providing for healthy rangelands or where it is not contributing to documented rangeland health problems. [We support the statement

1-3 in Chapter 1 that "there will be no arbitrary removal of livestock. If removing livestock will not fix a problem..., then livestock will not be removed."¹ In the analysis of the impacts of the four alternatives, however, removal of livestock is consistently the preferred method of addressing rangeland health problems.

Chapter 2: Description of the Alternatives

1-4 CCA has serious concerns with BLM's strategy for implementing the preferred alternative. Specifically, the screening process to be employed by BLM is extremely subjective. By the agency's own admission it has neither the personnel nor the financial resources to "classify each allotment or manageable grazing unit into one of three categories, based upon available data and the professional judgement of the staff."² According to agency staff, these will be subjective determinations based on existing knowledge or on evidence brought to BLM's attention by the public. CCA believes that such a method is both improper and inefficient. Interest groups with publicly state positions in opposition to grazing on public lands will demand action on allotments despite the lack of range science expertise or documented resource problems. Likewise, BLM will be forced to haphazardly deal with individual allotments as demanded by the public.

¹ "Rangeland Health Standards and Guidelines DEIS," Chapter 1, p. 8.

² *Ibid.*, Chapter 2, p. 3.

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Furthermore, while the term "significant" is extremely subjective, permittees will not be afforded the opportunity to appeal a determination that "significant progress is not being made toward meeting the standard(s), and livestock grazing is a significant contributor to the problem..."³ until an action is taken on their permit. As an alternative, CCA suggests that BLM incorporate these new standards and guidelines into the terms and conditions of grazing permits and leases as they are renewed or issued. Such an implementation strategy would ensure an orderly and efficient update of the grazing program while maintaining the agency's ability to act quickly in documented emergency situations. This strategy would also eliminate the arbitrary nature of the proposal contained in the DEIS while fostering continued cooperation.

1-4
cont.

Our criteria for evaluating these standards and guidelines are their conformity with underlying statutes and regulations, their scientific validity, their connection with the issue they are attempting to address, and the ability of the agency to implement them. CCA supports the general statement contained in the preambles to both the Bakersfield RAC and Ukiah RAC standards and guidelines that "where historical grazing use has been compatible with meeting the standards..., no permanent changes should be mandated in the existing grazing patterns without specific scientific evidence that changing the existing grazing pattern will improve the ability to achieve the standards."⁴ This statement should be applied to all BLM rangelands. We also support the assertion that "for any standard, guideline, term or condition to work, it must be capable of being achieved, based on sound science or good common sense, and be measurable, understandable, and economically feasible."⁵ We support the recognition in the preamble to the Susanville RACs standards and guidelines that healthy rangelands and the social and economic well being of rural communities are linked. Finally, we believe that successful implementation requires BLM to realistically analyze its personnel and financial resources.

Alternative 1:

1-5

The Bakersfield RAC refers to the need to provide habitat for special status species including BLM sensitive species. Please provide information regarding the process by which the agency designates species as sensitive.

1-6

The standard for riparian management states that "riparian/wetland vegetation, structure and diversity and stream channels and floodplains are, or are making significant progress toward,

³ *Ibid.*

⁴ *Ibid.*, Chapter 2, p. 6.

⁵ *Ibid.*

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1-6
cont. functioning properly and achieving an advanced ecological status."⁶ CCA believes that the concept of meeting or moving toward a standard should be added to each standard developed by the three RACs. The underlying regulations simply require progress toward healthy rangelands, and such a statement would ensure that grazing management need not be changed if progress is being made.

1-7 The Bakersfield RAC's Guideline 2 indicates that "continuous season-long grazing use is allowed if it has been demonstrated that it can be consistent with achieving a healthy, properly functioning ecosystem."⁷ While CCA supports changing management to address documented resource concerns, we are uneasy about several aspects of this statement. First, please define the term "properly functioning ecosystem" and provide the underlying authority for the definition. Second, we believe that the burden of proof should lie with the agency. In other words, the guideline should be restated as follows: *Continuous season-long grazing use will be allowed to continue unless the agency has scientifically demonstrated that it is not consistent with rangeland health.* We have similar concerns with the Ukiah RAC's guideline 12.

1-8 Guideline 9 proposed by the Bakersfield RAC indicates that rangelands will be rested "during critical times of plant growth."⁸ Please define this guideline further. Does this mean that all rangelands will be rested during critical times of plant growth, or does this simply apply to recovery from the "episodic events" cited in the guideline? The Ukiah RAC addresses this issue in a more concise manner.

1-9 The standards and guidelines proposed by the Bakersfield RAC indicate that "local managers must have the flexibility needed to determine which grazing practices will work best in each area, and to change those practices when necessary to achieve the desired rangeland conditions."⁹ However, the guidelines contain very specific stubble height requirements for all riparian areas in the Bakersfield District. While stubble heights can be an effective tool for monitoring proper use and addressing streambank stability and erosion concerns, these levels must be set on a site specific basis. Some sites do not support vegetation that achieves four inches of height in an ungrazed state. Furthermore, recent research suggests that much lower stubble heights can provide for plant vigor, streambank protection and sediment entrapment. Please refer

⁶ *Ibid.*, Chapter 2, p. 8.

⁷ *Ibid.*, Chapter 2, p. 9.

⁸ *Ibid.*, Chapter 2, p. 10.

⁹ *Ibid.*, Chapter 2, p. 6.

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1-9
cont. to Volume 18, Number 4 of *Rangelands* magazine (published by the Society for Range Management) for more information on this issue. Additional research indicates that "evaluation of the effectiveness of grazing management should be based on trends in resource attributes that are directly affected by grazing rather than attributes of a particular grazing treatment. For example, grazing use levels or degree of streambank trampling are not resource attributes and are inappropriate management objectives."¹⁰

1-10 Again, CCA supports the concept of meeting or moving toward standards contained in the standards and guidelines proposed by the Ukiah RAC. The concept should be applied throughout the standards and guidelines. However, the Ukiah RAC's standard for riparian areas also states that riparian health is indicated by a "diversity of insects and amphibians."¹¹ Amphibians are declining worldwide for a wide range of reasons unrelated to grazing. What actions will the agency take to address amphibian populations where grazing is not the underlying problem? CCA supports the recognition that point bars require time to become vegetated. Finally, CCA supports the exceptions and exemptions from the riparian standard listed on page 16.

1-11 The Ukiah RAC's guideline 4 indicates that all livestock handling and management facilities will be located outside of riparian areas. Does BLM propose to move all facilities currently located in riparian areas? If so, the cost must be borne by the agency.

1-12 We strongly support the Ukiah RAC's guidelines 18 and 20. Guideline 18 recognizes the need to coordinate range management activities with other multiple uses to address rangeland health, ensuring that grazing management will not be changed when another use is causing a resource concern. We also support aggressive action to reduce the invasion of exotic plants and
1-13 noxious weeds.

1-14 The Susanville RAC's standard on streams includes the criterion that "gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species."¹² CCA believes that the concept of "moving toward" colonization should be added to this statement.

¹⁰ Burkhardt, J. Wayne, "Grazing Utilization Limits: An Ineffective Management Tool," *Rangelands* (19(3)), June 1997, p. 9.

¹¹ *Ibid.*, Chapter 2, p. 15.

¹² *Ibid.*, Chapter 2, p. 20.

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1-15 CCA supports the manner in which the Susanville RAC has addressed stubble heights for
stream-side areas. Local managers should have the flexibility to establish thresholds that reflect
local conditions and site potential, and we support using this concept in both the Bakersfield and
1-16 Ukiah districts as well. We also support guideline 4. Again, other uses may impact rangeland
health.

1-17 We question the authority and the need for the transitional guidelines (guideline 14)
proposed by the Susanville RAC. The agency currently has the authority to take action on
grazing allotments with serious resource problems. The implementation process we proposed
above will provide for the timely update of permits for allotments that are already well-managed.
We believe, therefore, that guideline 14 should be eliminated.

Alternative 2:

Since alternative 2 retains the guidelines proposed by each of the RACs, CCA's concerns
are identical to those raised with respect to guidelines for alternative 1.

Alternative 3:

1-18 The No Action or Fall-Back Standards and Guidelines, by the agency's own admission,
are less comprehensive than alternative 1. Furthermore, CCA believes that several fall-back
guidelines are contrary to the spirit if not the letter of current law. Specifically, guideline 11
indicates that "the timing and duration of use periods shall be determined by the authorized
officer."¹³ The guideline fails to indicate that these types of determinations must be made in
careful and considered coordination, cooperation and consultation with permittees and lessees.

Alternative 4:

1-19 The Rapid Improvement/Rapid Recovery Standards and Guidelines are based on the
erroneous assumption that exclusion of livestock provides the most rapid improvement of
degraded resources. According to the document, the "guidelines contain all of the necessary tools
and direction to ensure rapid improvement and recovery of rangelands in at-risk or non-
functioning condition."¹⁴ This statement fails to recognize other factors that may be contributing
to at-risk or non-functioning condition. Furthermore, the statement assumes, without concrete
evidence, that excluding livestock improves range conditions more rapidly than any other
management option.

¹³ *Ibid.*, Chapter 2, p. 30.

¹⁴ *Ibid.*, Chapter 2, p. 32.

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1-20 Guideline 2 is confusing. According to the document, table D will be used to determine utilization levels for allotments that are in unsatisfactory condition. The footnote to the table, however, indicates that "ranges in good condition and/or grazed in the dormant season can withstand the higher utilization level."¹⁵ According to the footnote, then, table D applies to all rangelands. Furthermore, guideline 2 seems to indicate that any utilization by domestic livestock impairs rangeland. CCA believes that rangelands require grazing to maintain health and function. We also object to the 4-6 inch stubble height requirement contained in guideline 6. Current research indicates that stubble heights above 6 inches may not provide additional sediment entrapment and streambank stability because vegetation will simply lay flat in high water events. 1-21 Again, please refer to *Rangelands*, volume 18, number 4 and volume 19, number 3 for more discussion on utilization levels.

1-22 Even without the apparent bias against livestock grazing contained in alternative 4, the costs of implementing the alternative (in terms of both personnel and financial resources) would be prohibitive. CCA believes that alternative 4 should be eliminated from further consideration.

Chapter 3: Affected Environment

1-23 In its discussion of range improvement, the document fails to recognize the benefits of range improvements for uses other than livestock. In many cases, springs, wells and other off-stream water developments benefit wildlife as well as cattle and sheep. Rancher-maintained water facilities may be the only sources of water for wildlife on some BLM lands. The agency should evaluate the added costs of continuing to provide this water if a permittee is put out of business by these regulations. 1-24

The discussion of monitoring techniques appears to be comprehensive. The key to rangeland utilization and trend monitoring, we believe, is up-front agreement on what to measure, where to measure, and how to measure. This type of preliminary work helps to avoid misunderstandings between BLM, other government agencies, permittees and the public. Furthermore, given BLM's statutory requirement to consult with permittees, all monitoring must occur in close coordination with permittees. In establishing utilization and residue objectives, the DEIS indicates that if "key species are grazed conservatively they will improve in vigor."¹⁶ Plant vigor varies by species and by grazing level; a more correct term may be "grazed appropriately." 1-25 Finally, CCA supports the establishment of confidence intervals for interpreting monitoring data.

¹⁵ *Ibid.*, Chapter 2, p. 33.

¹⁶ *Ibid.*, Chapter 3, p. 14.

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Monitoring techniques are estimates at best, and confidence intervals help ensure that management changes are not made arbitrarily.

1-26

In analyzing the existing situation, the DEIS indicates that little effort has been made to interpret current data regarding grazing allotments. However, the document follows by stating that 16 percent of the 705 allotments analyzed are not meeting one or more of the fundamentals of rangeland health. Please provide additional information about this data and about the type of analysis undertaken to make this determination. In addition, please provide further information about whether management changes will be made on those allotments that are progressing towards meeting these fundamentals.

1-27

In discussing the relation of grazing to soils, the DEIS states that "removal of vegetation by livestock grazing can reduce litter production and accumulation. Litter provides surface cover which protects the soil from erosion and contributes organic carbon and nutrients to the soil."¹⁷ Without removal of plant material, however, too much litter may accumulate. Residual dry matter levels are developed to leave the appropriate level of litter for erosion protection and replacement of organic matter.

1-28

The document also states that roughly 120,000 acres are not currently meeting soil condition standards, but it fails to analyze the causes for these failures.

1-29

Vernal pools are a microcosm of the ecological and economic importance of grazing on public lands. Sheila Barry's research demonstrating the benefits of properly managed grazing for maintaining and enhancing vernal pool vegetation indicates that California's rangelands require grazing to be sustainable. Furthermore, most of California's remaining vernal pools are on privately owned rangeland. The continued viability of this habitat (and of habitat for numerous other plants and animals) depends on the continued profitability of livestock production. On a large scale, the availability and affordability of federal rangelands influences the profitability of ranching in California. Not only are the private lands and federal grazing allotments of permittees interdependent economically; the continued ecological integrity of private rangeland habitat depends upon a permittee's ability to utilize federal rangelands for at least part of the year. These proposed standards and guidelines must be analyzed for their collateral effects on private lands as well.

1-30

The DEIS states that "the sagebrush steppe vegetation of today is greatly different from that of presettlement times."¹⁸ Unfortunately, the document fails to detail these differences.

¹⁷ *Ibid.*, Chapter 3, p. 17.

¹⁸ *Ibid.*, Chapter 3, p. 26.

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1-30 Furthermore, the DEIS indicates that domestic livestock grazing has greatly altered the "pristine"
cont. vegetation in the Great Basin. Some research indicates that these "pristine" communities evolved
in coexistence with large grazing ungulates. Perhaps changes in the frequency and intensity of
fire have had a much larger impact than the substitution of cattle and sheep for other large
herbivores. Please refer to "Herbivory in the Intermountain West" by Dr. J. Wayne Burkhardt
(University of Idaho Station Bulletin 58 (October 1996)).

1-31 Riparian habitat and wetland sites are certainly a critical issue for range managers. The
DEIS correctly indicates that these areas "are focal points for recreation, including fishing,
hunting, camping, boating, hiking, nature observation, photography and picnicking."¹⁹ The
document further states that these activities contribute high economic value. This paragraph
raises several important questions that the agency fails to analyze fully. First, each of the uses
cited above have tremendous potential to degrade riparian habitat by contributing to the removal
of vegetation, the destabilization of streambanks, the compaction of soil, and the impairment of
water quality. Furthermore, the statement regarding high economic values is misleading if it is
not qualified. The agency does not receive user fees for these types of activities (while grazing
permittees pay grazing fees). Furthermore, while recreation does generate economic activity,
1-32 most of this activity does not occur in the rural communities nearest to BLM lands. Discussions
with long-time residents of Lassen County indicate that most recreational visitors make the
majority of their recreation expenditures in their home communities. Unsubstantiated statements
like the one cited here are inappropriate for this document.

1-33 Citing research by Kattelman and Embury, the DEIS states that "riparian vegetation
degraded by overgrazing generally recovers within a decade once grazing pressure is removed."²⁰
CCA objects to the assumption that the only option for restoring degraded riparian sites is to
remove livestock. A variety of other management options are available and can achieve similar
results. In stating that removal of grazing pressure is the most effective option, the document is
unnecessarily biased. Members of the public who are not familiar with grazing management may
automatically assume that all grazing is harmful.

1-34 Proper grazing management has been demonstrated to improve mule deer habitat. The
decline in mule deer numbers since 1960 may be related to several trends involving the livestock
industry. First, reductions in deer coincide with reductions in grazing on public lands, indicating
that more grazing may benefit deer populations. Second, private rangelands contribute

¹⁹ *Ibid.*, Chapter 3, p. 38.

²⁰ *Ibid.*, Chapter 3, p. 42.

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1-34. cont. significantly to winter habitat for deer. As ranching becomes less profitable (due in part to government regulations), some of these private rangelands have been developed, destroying or fragmenting habitat. Finally, California's protection of the mountain lion has resulted in the proliferation of one of the mule deer's main predators.

1-35 While livestock and elk do not share dietary preferences, conflicts do arise from this relationship. Transplanted tule elk in Lake County have destroyed fences on private rangelands. Rocky Mountain elk, beginning to migrate onto the Modoc Plateau, have caused problems in riparian areas that influence some ranchers' ability to graze these rangelands.

1-36 Riparian dependent species are an important consideration in managing public rangelands. The DEIS indicates that the "conservation of neotropical migratory land birds in the Western United States depends greatly upon the protection and restoration of riparian woodlands."²¹ CCA believes that recognition of the harmful effects of pesticide use in Central and South America would also be appropriate in this analysis.

1-37 Evaluating proper functioning condition of stream habitats provides useful information, but an analysis of the reasons for which some streams were determined to be functioning at risk or non-functional is necessary before management changes can be proposed or implemented. The discussion on page 52 of Chapter 3 fails to provide such analysis.

1-38 CCA appreciates the statutory challenges faced by BLM in managing wild horses and burros on its rangelands. However, the DEIS indicates that the rangelands analyzed in this document currently support 45 percent more horses than the agency's "appropriate management levels." The analysis fails to adequately discuss the implications of this overpopulation on the fundamentals of rangeland health.

1-39 With respect to recreation, the DEIS values local economic contributions at \$400-500 million. Please provide references to substantiate this figure. While the DEIS does briefly describe the potential environmental problems associated with recreation, it improperly attributes water quality problems (specifically giardia) entirely to livestock. Current research indicates that wildlife and humans are significant sources of giardia. CCA recommends that BLM review research conducted by Dr. Rob Atwell at the U.C. Veterinary Medicine Teaching and Research Center in Tulare. His analysis indicates that all mammals shed giardia, and that many scientists still debate whether giardia cysts obtained from livestock can infect humans.

²¹ *Ibid.*, Chapter 3, p. 51.

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1-41 The DEIS states that "historically, ranching (starting with the Spanish missions) has directly conflicted with Native American traditional lifeway values; in many cases, totally destroying people's ability to practice those lifeways."²² The term "total destroying" is much too strong and indicates bias on the part of the author of this section. While the religious nature of the Spanish missions certainly did have a tremendous impact on Native American culture and religion in California, CCA believes that blaming grazing for the total destruction of Native American culture is completely inappropriate.

1-42 The economic analysis of the livestock industry is for the most part very complete. Several inconsistencies and inaccuracies, however, do require comment. As the DEIS indicates, cattle prices dropped by more than 50 percent between 1991 and 1995. Costs of production during that same period, on the other hand, at least kept pace with inflation. Furthermore, complying with local, state and federal regulations represents an ever-increasing cost for most ranchers. Indeed, Table 3.10.1.3(a) (page 64) reveals that those ranches with the lowest dependency on federal rangelands (and, therefore, lower regulatory costs) were the most profitable. In analyzing BLM's costs of administering its grazing program, the document fails to recognize that some of the activities currently charged against grazing management (i.e., vegetation management, watershed analysis, etc.) would be incurred even if grazing was eliminated.

1-43

1-44 A study produced by the U.C. Agricultural Issues Center in 1992 indicates that California's farms generate approximately \$58 billion annually in personal income for Californians. The same study indicates that agriculture supports 1.4 million jobs in California (nearly 10 percent of all the jobs in the state). In 1995, on-farm income generated approximately \$22 billion in economic activity. The U.C. study reveals that California's farms are the beginning of a cycle that adds \$63 billion in value to the state's economy (about 9 percent of the annual total value added by all California businesses).²³ This information indicates that the data presented in Tables 3.11.2.1(a) and (b) is in error. The document itself recognizes this error, stating on page 67 that California agricultural sales generated \$17.05 billion in 1992 and on page 71 (Table 3.11.3.2.(b)) that agricultural income was roughly \$7.2 billion in 1996. Agricultural income has certainly not fallen by nearly \$10 billion in the last 4 years (it has, in fact, increased to \$22 billion).

²² *Ibid.*, Chapter 3, p. 60.

²³ Carter, Harold O., and George Goldman, "The Measure of California Agriculture: Its Impact on the State Economy," U.C. Agricultural Issues Center, 1992.

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1-45 [The cattle inventory numbers cited in Table 3.11.2.2(b) are also misleading. Including dairy cattle, California did indeed have 4.7 million head of cattle in 1992. Dairies are not typically BLM grazing permittees, so dairy cattle should be eliminated from this analysis. California's beef cattle inventory for 1995 was as follows: approximately 890,000 cows, 1,125,000 stockers (weaned calves), and 595,000 cattle in feedlots (for a total of 2,610,000 head of beef cattle). These numbers have trended downward over the last several years due to the depressed cattle market and the drought of the late 1980's and early 1990's.

1-46 [According to BLM, approximately one-third of the authorized AUMs went unused in 1996. This would seem to indicate that even with grazing fees at \$1.35 per AUM, grazing on BLM lands is not cost effective for some permittees.

1-47 [Table 3.11.3.2(c) provides information about the economic contributions of tourism. Unfortunately, no source is included for this data. Please provide the references used to make these estimates.

1-48 [Finally, the DEIS states that California rural land prices in 1995 averaged \$2,215 per acre. This average is extremely misleading. Vineyard land in California is worth well over \$10,000 per acre. Rangeland in northeastern California, on the other hand, is comparable in value to Nevada agricultural lands. Most ranchers that utilize BLM rangelands in California would be thrilled to learn that their ranches were worth \$2,215 per acre.

Chapter 4: Impact Analysis

1-49 [The introduction to this chapter states that the fallback standards fail to address all of the fundamentals of watershed function, nutrient cycling and energy flow, water quality and wildlife habitat. Alternative 3 should therefore be removed from further consideration.

1-50 [Chapter 4 seems to emphasize reductions in grazing as the primary option for addressing resource concerns. While reductions may be simple to analyze economically, they are by no means the only option available to range managers. By emphasizing reductions, the agency is telling the public that grazing is detrimental to rangeland health and that elimination of grazing is the best option for improving these environments.

1-51 [Annual grasslands will likely experience no change in fire frequency under any of the alternatives, according to the document, although prescribed fire may be used "establish perennial

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1-51 : grasses, to improve the habitat for special status species, or to manage fuel levels."²⁴ CCA
cont. : supports the use of prescribed fire to improve and/or increase forage for livestock as well.

1-52 : CCA finds the assertion that all resource conditions will improve most quickly under
alternative 4 to be inappropriate and misleading. By creating the perception of punishing
livestock operators (by reducing or eliminating grazing permits where resource concerns exist)
alternative 4 will create a sense of mistrust with BLM's most important land management
partners. Furthermore, research and experience indicate that properly managed grazing can often
improve rangelands faster than the cessation of grazing. CCA does concur with 1993 research
by Rosgen stating that "it has been demonstrated that good grazing practices can actually improve
the stream and riparian condition...."²⁵

1-53 : The section describing impacts on wildlife indicates that the standards would result in a
trend to later seral stages with more grass and herbaceous cover. Later seral stages, however,
may not be best for all species of wildlife, including mule deer. BLM predicts that
1-54 : implementation of the standards and guidelines would improve or maintain elk habitat. What are
the potential environmental impacts of larger elk populations, both on BLM and on private lands?

1-55 : According to the DEIS "25 of the 149 special status plants known to occur within the
project area are negatively impacted by current grazing management practices...."²⁶ Please
provide the research upon which this statement is based.

1-56 : The agency claims that the issue of wild horse and burro overgrazing is outside of the
scope of this analysis. Since problems associated with wild horses and burros are often blamed
on domestic livestock, CCA disagrees with this assertion. Implementation of these standards and
guidelines will only be successful if BLM changes grazing management where domestic livestock
grazing has caused resource concerns. If grazing management is changed to address a problem
caused by another use, the situation will not improve.

1-57 : An additional question posed by the section dealing with wild horses and burros is the
assertion that implementation of the standards and guidelines will increase the potential for wild
horses and burros to be gathered and removed. Please provide the rationale for this assertion.

²⁴ "Rangeland Health Standards and Guidelines," Chapter 4, p. 5.

²⁵ *Ibid.*, Chapter 4, p. 12.

²⁶ *Ibid.*, Chapter 4, p. 15.

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1-57
cont. [In addition, if wild horse and burro populations will grow more rapidly with the new standards and guidelines, please provide an estimate of the increased costs of management that will be incurred by BLM.]

We agree with BLM's finding that "recreational activities will continue to contribute to environmental degradation."²⁷ CCA supports holding recreationists to the same standards to which grazing permittees will be held.

1-58 [With respect to wilderness, the document seems to indicate that the standards and guidelines will reduce livestock in wilderness areas, and that such reductions will make these areas "appear or actually be more natural."²⁸ Why is reduction of livestock the agency's first choice? The term "more natural" is very subjective and seems to indicate that at least some within BLM do not feel that grazing is an appropriate use of these resources.]

1-59 [In evaluating the differences between alternatives, the DEIS states that under alternative 1, currently authorized grazing use would be reduced by over 16,000 AUMs in the first five years. The document adds that these reductions would result from partial exclusions, not from excluding entire allotments. The agency apparently assumes that permittees who receive partial reductions will remain in business. Past experience indicates, however, that when reductions exceed a certain critical level, permittees will opt to abandon the permit and/or exit the industry. The DEIS must analyze this phenomenon and its potential impact on the industry, on communities and on the environment.]

Under alternative 1, the agency anticipates the eventual increase in sustainable grazing capacity above current levels. In the event that the selected alternative increases this capacity, CCA looks forward to working with BLM to ensure that increased AUMs are made available to grazing permittees.

1-60 [By BLM's own admission, alternative 4 exceeds the agency's current staffing and funding levels. As Congress moves to balance the federal budget, CCA believes that additional funding is unlikely, making alternative 4 inappropriate financially. Furthermore, much of Chapter 4 indicates that ecological improvement will occur faster under alternative 4 than under the other three simply because alternative 4 will be implemented more rapidly. The DEIS presents little

²⁷ *Ibid.*, Chapter 4, p. 19.

²⁸ *Ibid.*

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1-60 if any scientific evidence to support this assertion. As indicated previously, CCA believes that
cont. alternative 4 should be abandoned.

1-61 In its economic and employment impacts analysis, BLM indicates that 32.3 percent of authorized AUMs were unused in 1996. The agency predicts that alternatives 1-3 will result in an additional reduction of 4.8% from current AUMs. As we requested previously, please provide some estimate of those permittees who will opt to take non-use or to terminate their permit because the reductions caused by these standards and guidelines will make such action more attractive.

1-62 Possessory interest taxes, while a relatively minor portion of counties' overall tax revenue, should be analyzed by this document. Please provide at least an estimate of possessory interest taxes for 1996.

1-63 BLM anticipates the loss of permit value caused by these standards and guidelines to be offset by increases in real estate value. In California, increases in the value of rangelands are driven by demand for development. The agency's assumption, therefore, implies that development will provide a viable economic alternative for ranchers who are dependent upon BLM rangelands. As a result, CCA strongly believes that the agency must analyze the impacts of conversion from rangeland to real estate on the environment and on local communities. BLM admits that the costs of conversion are not considered²⁹ but fails to explain its reasons for this omission.

²⁹ *Ibid.*, Chapter 4, p. 38.

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Conclusion

Again, CCA appreciates the opportunity to comment on the proposed Rangeland Health Standards and Guidelines for California and Northwestern Nevada. While we have some concerns with the standards and guidelines and with the analysis presented in the DEIS, we compliment each of California's three resource advisory councils for their efforts. We look forward to working with BLM to ensure that the final EIS is based on sound science and to ensure that the final standards and guidelines are implemented equitably.

Sincerely,



Daniel K. Macon
Assistant Vice President

cc: Local Association Presidents
CCA Public Lands Committee
California Congressional Delegation
California State Legislature



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CALIF STATE OFFICE
 SACRAMENTO, CALIF.

June 23, 1997

Bureau of Land Management
 California State Office
 2135 Butano Drive
 Sacramento, CA 95825

Attn: CALIFORNIA RANGELAND DEIS

The Animal Protection Institute is a national nonprofit citizens group with a special interest in public land wildlife including wild horses and burros. We have well over ten thousand members in California vitally concerned with the protection of black bear, mountain lion, bobcats, fox, pine martin, badgers, and coyotes on federal lands. Wild horse protections, predator control activity, and fur trapping on BLM lands are of major concern to us.

2-1 The draft EIS is impressive and informative. The Advisory Councils did an outstanding job of formulating their standards and guidelines. We studied them carefully with particular attention to Susanville's because this is where most of California's wild horse populations occur. Since predator control is a livestock grazing issue, we are acutely aware that the predator/prey balance is not part of your Chapters on Affected Environment and Environmental Consequences. For us, this is an enormous omission.

The document contains such useful information, it is of value as a basic textbook. It forces all parties to talk the same language, which has been badly needed for some time both inside and outside BLM. Hopefully the other states come up to the same quality as California in their DEISs.

Because the ecological language of the 1971 Wild, Free-roaming Horse and Burro Protection Act requires BLM to manage for the thriving natural ecological balance in the areas where wild horses and burros occur, API has been a longtime advocate of recognizing the allowable utilization level (AUL) as synonymous with the thriving natural ecological balance. We have preached and protested for many years that the percent of the annual growth left on the plant is to provide for wildlife habitat, watershed, soil stability/composition, and the regeneration of the plants (photosynthesis). While it is refreshing to see BLM come at last to this ecological perspective, I have to say that 75 percent of my own understanding and knowledge of an ecological management perspective derives from BLM's own pre-James Watt technical documents and field staff explanations. In actuality, this DEIS is BLM coming back to its own ecological approach required by NEPA, range condition as defined in FLPMA, and the sustained yield principle Congress intended.

Thus it was shocking to come upon the section related to wild horse management in Chapter 3. Nothing could be more wrong than the information on pages 3-52 through 3-56 and more out of step with all the foregoing.

2-2 Here, you have exempted the Montgomery Pass wild horse area saying its population is stabilized by mountain lions. In fact, this is the only area where a study on mountain lion predation on wild horses was ever conducted. The ecological language in the wild horse law requires extensive consultation with wildlife agencies and experts for the purpose of maintaining the natural ecological balance among wildlife in the given area. For us this includes natural predation as a stabilizing factor. We don't know, nor does BLM, if Dr. Turner's findings apply in areas other than Montgomery Pass. The North Stillwater wild horse population in Nevada was at one time said, by BLM, to be stabilized and the reason was thought to be mountain lions (Winnemucca District). This is

2-2 cont where the sonic booms of low altitude military training drove the ranchers out of Dixie Valley so there was no demand to control predators. Our concern for protecting the predator/ prey balance and wanting to see it included as a significant part of the environment directly affected by livestock grazing is as a required (e.g., by law) wild horse management consideration as well as an inhumane and irrational wildlife extermination program conducted exclusively for the benefit of livestock operators.

2-3 On p.3-50 there is an interesting description of the historical existence of pronghorn at the time of the first Europeans--with a density greater than "any area west of the Mississippi." Yet there is not one word of the wild horse populations at the time the first Europeans began to settle. I know from my own family history that huge numbers moved back and forth between the Carizzo Plains and the Santa Lucia Mts between the San Antonio and Nacimiento Rivers but as far north as the headwaters of the Arroyo Seco. In the cultural background section, there is also a lack of information on the influence of the Spanish land grants or outfits like Miller & Lux on the grazing history in the State. This lack causes a blur with regard to just how historical, how entrenched as a culture, is today's rural ranching community and lifestyle. This is not in opposition to that ranching lifestyle, it is to raise the question of taxpayers subsidizing the destructive impact of that lifestyle on our public lands.

2-4 To its credit the section in the DEIS on the real estate value of AUMs is candid and out on the table at long last. But missing is the use of this real estate value as collateral on loans. It is the impact of AUM reductions on the permit as devaluing the collateral forcing foreclosures and possible bankruptcy that has been the driving force behind BLM's status quo management which the Secretary is trying to correct today. To ignore the use of AUMs as collateral is to avoid the very thing that has obstructed full compliance with the policies of NEPA and other range laws for the past sixteen years. In fact going all the way back to the adjudications of forage allocations on the 1964-65 ten year permits and carried over decade after decade as "preference." Still the information that cattle ranching in the eleven western states, containing federal rangeland with grazing privileges, makes up only 22 percent of beef production and 19 percent of sheep with the public land providing only 25 percent of forage intake for cattle, 5 percent for sheep, is surprisingly low. You report the California and Nevada figures for dependency on public land forage by permittees and leasees as 15 percent in California and 36 percent in Nevada. Turned around it means 85 percent of livestock forage in California and 64 percent in Nevada comes from sources other than public lands. Yet in 1993, the government collected 28.1 million in fees and spent 94 million to service ranchers on public lands. This translates to the rancher paying \$1.86 per AUM and the taxpayers paying \$3.90 per AUM to maintain his lifestyle.

2-5 "Beneficial use" terminology is used. But what we see is the senseless extermination of predators for the exclusive benefit of livestock operators, miles of pasture and boundary fences constructed for the exclusive benefit of livestock operators, native vegetation chained, plowed and reseeded for the exclusive benefit of livestock operators, and millions of dollars allocated for water development for the exclusive benefit of livestock operators. While the benefit of public land livestock to local economies or the nation at large as a source of food and fiber is minimal.

2-6 There is no analysis of the impact on that 85 percent non public land forage if reductions in public land AUMs are required to meet restoration and improvement objectives. Since water quality and usage is one of the major consequences being considered and irrigating alfalfa fields is one of the major draws on California waters, this relationship between alfalfa farmers, public land permittees, and water use in California appears to be a very significant factor in the overall equation. What percent of alfalfa production is for the exclusive benefit of public land livestock operators?

2-7 As we study the consequences of the alternatives on the natural systems being analyzed (Riparian vegetation, hydrologic systems, wildlife, soils, and upland plant communities), the outcome is the same for all. So that the question is the timeframe between Alternatives 1-3 and Alternative 4. But the "range improvements" for grazing systems all require increased fences to convert open range to cow pastures and new water developments that put

2-7
cont.

livestock into areas they have not yet damaged. We disagree with the wisdom of this. It is particularly questionable in light of your facts regarding the ever increasing recreational and non-consumptive use of the public lands.

2-8

Chapter 4 perpetuates another myth about wild horses. That is that wild horses move into riparian areas when cows leave. So it is really the wild horses causing riparian damage, not cows. It is wild horses preventing successful restoration projects.

All of our information on wild horse grazing patterns (from the National Academy of Sciences field report to individual observers such as Frei within the BLM, who timed horses at a water source, as well as BLM census/distribution maps, to reports by Downer and others outside BLM) is that wild horses move into a water source, drink, and move out again to graze from three to ten miles away. Those who have adopted wild horses are well aware of the "space factor" which triggers their horse's flight response when they begin their gentling program. The National Academy of Science Phase I field study reported the significance of bands maintaining a distance from each other that evenly distributes them over a given area. Conflicts occur between bands when that space diminishes at a water source. The hearsay claim that horses come into the riparian area to graze thus causing the damage, needs to be shown. Otherwise it flies in the face of a wild horse's grazing pattern. Furthermore, the grazing pattern of wild horses is dictated by their digestive system which requires exercise to function properly (Downer). They do not congregate near water chewing their cud; horses nibble as they mosey along. When looked at from Alan Savory's discussion of root recovery between "hits" during the growing season, the highly mobile wild horse's chance of "hitting" the same plant twice is highly improbable. I have studied dozens of use pattern maps, they all show slight/light utilization in radials from three to ten miles out which is wild horse usage not cows.

It is popular to use wild horses as scapegoats and it is also the line of least resistance within BLM field office. This is not to say that where there is an overpopulation of wild horses excess should not be removed. But the 1978 amendment spells out how BLM is to determine if an overpopulation exists and whether the removal of excess is needed. Implementing that statutory language requires monitoring and current inventories of range condition which, if they were done, preclude such hearsay and biased statements about wild horses moving in when livestock leave. The very reason the law requires it be documented is to force technical, not political, decisions by BLM.

2-9

The DEIS does say that these standards and guidelines do not apply to wild horses and burros. But it does not explain the statutory management directives in the law. Instead it refers to regulations which were struck down by the IBLA but never changed by BLM. Instead the Strategic Plan, which contradicts the law and the IBLA rulings, was put in place to avoid making the needed changes to regulations. The Strategic Plan was never subjected to public comment or its impact on wild horse bands analyzed. "AML" is the acronym for the appropriate management level after determining if there are excess and determining if excess need to be removed or other options are available. IBLA says that the appropriate management level is synonymous with the optimum number to leave. They point out that BLM is authorized to remove only the number of excess needed to restore the thriving natural ecological balance [which is measured as the allowable forage take-off or "AUL"]. Dahl v Clark says the law does not authorize managing for a number. Yet the description in the DEIS, p. 3-52 to 3-56, describes the very policy of maintaining a management number set through land use planning that IBLA ruled against, the federal court ruled against, the GAO found against, and any unbiased layperson reading the law would disagree with.

Therefore we request that pages 3-52 to 3-56 be deleted and a new section that quotes the law, the IBLA, the Dahl v Clark ruling, and your own 1990 Biennial Report to Congress. Also correct the unsubstantiated statement in Chapter 4. It doesn't change the DEIS only the information being given to the public as if existing policy were in compliance with law.

- 2-10 We also request that both the Affected Environment and Environmental Consequences include the impact of
livestock grazing on the predator/prey balance. We support much that is in the Proposed Alternative with the
2-11 exception of new waters to correct distribution by spreading destruction and fences that create cow pastures. We
opt for the fast recovery time frame of Alternative 4.

FOR THE ANIMAL PROTECTION INSTITUTE

Nancy Whitaker
Nancy Whitaker
Public Land Wildlife Division

BOB MILLER
Governor

STATE OF NEVADA

Letter # 3, page 1
PAUL IVERSON
Administrator

CLAUDIA K. CORMIER
Director



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JUL 3 12 41 PM '97

DEPARTMENT OF BUSINESS AND INDUSTRY

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CALIF STATE OFFICE
SACRAMENTO, CALIF.

June 26, 1997

Ed Hastey, State Director
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, California 95825

attn: Rangeland DEIS, Nevada SAI # E1997-144

To	Initial	Date
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Dear Mr. Hastey:

Thank you for the opportunity to comment on the Rangeland Health Standards and Guidelines for California and Northwestern Nevada. The document appears complete and well written. However there are some points our agency would like to make, particularly in regards to the Susanville RAC recommendations.

3-1 Although there are four alternatives listed to improve rangeland health, it is not clear what criteria will be used to determine which alternate will be used and when. We are especially concerned with alternate #4, the rapid improvement/rapid recovery standards and guidelines. We agree that rangeland must be kept in, or moved toward the goal of proper functioning condition. However, a reasonable period of time must be allowed to reach this functioning status.

3-2 If this alternative is utilized excessively, then not only would this remove appropriate management flexibility but result in a greater short term and possibly long term economic impact. The agency must be sensitive to this, even if a minority of persons are impacted. The agency must recognize that rural communities have the right to a thriving economy that in many cases is not driven by tourism and recreation interests. In these rural communities, the cumulative adverse economic effect of an AUM reduction would most likely be intensified.



Nevada Department of Business & Industry

Jim Connelley, Chair: Livestock
David Cassinelli: Livestock
Frederick Dressler: Livestock

NEVADA BOARD OF AGRICULTURE
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John Cooper: Vice Chair: Petroleum
Dan Nakamura: Row Crops
Darrel Southworth: Pest Control

Again, I would like to thank you for this opportunity to provide input into the final document. If you have any questions, please contact me at 702-688-1180.

Sincerely,



Paul Iverson
Administrator

cc: Julie Butler, Director, Nevada Clearinghouse

RECEIVED
BUR OF LAND MGMT

DATE: July 9, 1997

TO: Ed Haste, State Director
BLM, California State Office
2135 Butano Drive
Sacramento, CA 95825.

Jul 18 2 15 PM '97

FROM: W.A. Laycock, Professor Emeritus
Dept. Rangeland Ecology and Watershed Mgt.
University of Wyoming
Laramie, WY 82071CALIF STATE OFFICE
SACRAMENTO, CALIF.SUBJECT: Review of Draft EIS "Rangeland Health Standards and
Guidelines for California and Northwestern Nevada"

I find it difficult to believe that a several hundred page document is needed for this DEIS. When the various RACs were formed (I am a member of the Wyoming RAC, which is now under state control) I felt that it was completely unnecessary for this many individual RACs to be working independently on Standards and Guidelines for states or BLM districts within states. This document presents separate S&Gs for 3 different BLM districts. This is unnecessary duplication.

4-1

In addition, I find little evidence that individual members of the three RACs had much influence in this document. I review many EISs and other documents from the BLM every year and this one has many of the same characteristics of all of the other BLM-written documents I have reviewed. It appears that the 3 RACs simply "rubber-stamped" a BLM-written document. The exception may be some of the items included as "guidelines" for the 3 districts. Some of these indicate input by someone outside the BLM.

The membership of the 3 RACs (p. 4-5, Ch. 5) shows a conspicuous absence of anyone from the Range Science community. How can any RAC and the BLM write a document that should represent the state-of-the-art in range science with no representation or input from range scientists?

The following comments are somewhat in sequence. However, where appropriate, I grouped comments about a specific topic together even though they referred to different parts of the DEIS.

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W.A. Laycock

SPECIFIC COMMENTS ON DRAFT EIS
"RANGELAND HEALTH STANDARDS AND GUIDELINES
FOR CALIFORNIA AND NORTHWESTERN NEVADA"

by

W.A. Laycock
Professor Emeritus
Dept. of Rangeland Ecology and Watershed Management
University of Wyoming, Laramie, WY 82071

4-2

Definitions of "Standards" and "Guidelines": The BLM and the 3 RACs need to look in a good dictionary for the definitions of "Standards" and "Guidelines". The BLM, in the regulations and in this document, reversed these 2 terms and improperly defined them. By dictionary definition, a "guideline" is just that, something broad that is used for guidance. A "standard" is "that which is set up and established by authority as a rule for the measure of quantity, weight, extent, value or quality". Thus, a "standard" should be something that is specified at the site specific (AMP) level which has defined performance criteria tied to it. What the BLM has defined as "standards" are really "guidelines", etc. Why have an English dictionary if any agency can re-define words to fit its own agenda?

4-3

"Fundamentals" of Rangeland Health: (Ch. 1, p. 3-4, Ch. 2, p. 5 & 12): Even though these 4 "fundamentals" of rangeland health are stated in the BLM regulations, that fact does not make them valid as true "fundamentals". The first two "fundamentals" are based on highly modified information from the "Rangeland Health" book but even that book did not call these items "fundamentals". The last two are simply "obey the law" type of statements that have nothing to do with anything resembling a "fundamental". The BLM should re-think these 4 "fundamentals" and work with the range science community to come up with "real" fundamentals of rangeland health. The ones stated simply subject the BLM to criticism.

In Chapter 4 (p. 3, 4.2.1 Grazing Management) you state that "16% (of the 705 grazing allotments) are estimated as currently not meeting one or more of the fundamentals for rangeland health". The way they are written, how can you possibly know that a given allotment is either meeting or not meeting one or more of the "fundamentals"? If Standards and/or Guidelines are properly written and, if ways to monitor them are specified, you may be able to tell if an allotment is not meeting one or more Standards or Guidelines. I do not believe that anyone ever intended that individual allotments be tested to see if they meet any or all of the 4 "fundamentals". Even if the 4 "fundamentals" were really valid (they are not), this would be true, i.e., "fundamentals" are not what you test to see if an allotment is in compliance. The logic of all of this needs to be examined.

Over-emphasis on utilization and/or stubble height limitations--

I find it extremely disturbing that this document dictates utilization or stubble height (residue) limits for all 3 districts. Such limits should be set only at the AMP level, only as a "tool" to achieve a stated objective and never as a land management objective. This document dictates utilization limits in Chapter 2 (Table A, p. 11; Table B, p. 17; Table C, p. 28; Table D, p. 33) and Chapter 3 (Table 3.2.5, p. 15). Table 3.2.5 in Chapter 3 is especially disturbing because it was lifted out of a range management textbook intended for use in a beginning-level course and never intended to be used as a management guide.

The whole table (3.2.5) uses research data in an extremely inappropriate manner including a reference to one of my published papers. My cited paper (Laycock and Conrad 1981) presented information on the amount of utilization actually observed in a grazing study on high elevation sagebrush rangelands. No where in the paper did we "recommend" that 30-40 percent utilization was the maximum amount of utilization that these rangelands could sustain. Nothing in the paper gave any indication that the observed actual utilization levels should be "limits". However, this is what Holechek's table (and this and the other tables in your DEIS) dictate. The same is true of almost every reference in the Holechek table. Thus, Holechek misused research data in preparing this table and you are misusing research data by reprinting this table and the tables referred to above to limit utilization to a predetermined arbitrary level.

4-4

You also cite a 1991 Holechek paper that is not readily available and was not published in a peer reviewed source. The following statement from his 1991 publication (cited on p. 14 in Ch. 3):

"However, in most cases it (50% utilization) causes range destruction in the rugged, arid ranges of the West."

is not supported by scientific evidence and is contrary to the opinion of most current range scientists. Holechek has a very different view of utilization than the majority of the range science community. Your choice to use him as your sole reference concerning utilization puts a deliberate and unjustifiable slant on the document. Remedy this by including other appropriate literature (see below) and eliminating the Holechek references.

This DEIS document should not have any utilization figures or tables in it. As indicated both above and below, utilization is one tool to achieve a land management objective. As such, setting of utilization levels should be done only at the individual AMP level. Utilization levels should not be set at the district or state level covered by this document and all of the tables containing utilization or stubble height (or residue) standards should be removed from the DEIS.

4-4
cont.

The other faulty assumption concerning utilization that occurs throughout this document is that lighter levels of utilization will speed recovery of a plant community. This is community-dependent but, as a general concept, is not true. For most western range communities, imposing light levels of grazing or no grazing at all will not result in faster recovery than will occur with moderate levels of grazing in the proper season. Areas where improvement is desired often are in a lower successional "stable state" (see Laycock 1991) and will not improve with a change in grazing intensity in any time frame meaningful to management. Generally, something else has to be done (like brush control) in conjunction with moderate (not necessarily light) grazing at the proper season, before the desired improvement starts to take place. In most situations, periodic heavy grazing, a change in the season of grazing, or some other specific grazing treatment often leads to desired change much faster than simply reducing or removing grazing pressure.

4-5

Using utilization as an "objective" instead of a tool-- Coupled with the mis-use of research data in setting utilization limits is the completely erroneous practice of specifying utilization levels as "objectives". On p. 13 of Chapter 3, the last paragraph states: "Management objectives are developed that specify how much utilization is allowed...". As indicated above, utilization (or residue) is a tool to achieve a land management objective (such as a Desired Plant Community) and should never be used or stated as an objective.

Recommended papers on utilization--Attached are 3 papers concerning the use, and especially the misuse of utilization. Consider these papers as an official part of my review. All 3 must be cited and referenced in the EIS. More importantly, the information in the papers should be read and understood. The one written by a BLM Range Conservationist in Nevada clearly defines how the FS and BLM misuse utilization. When these papers are used, most of the information on utilization in this DEIS would have to be removed because it is factually and logically flawed and therefore erroneous.

4-6

Exceptions to Standard 4 (Susanville RAC), Riparian and Wetland Sites--the listed exceptions and exemptions to Standard 4 (Ch. 2, p. 21) are excellent. Stock water facilities, etc., are areas that too many people try to fit into riparian or wetland standards or guidelines.

4-7

Minimal use of the concept of "Desired Plant Community" (DPC) in either "Standards" or "Guidelines" (Chapter 2): The term DPC is used only sparingly in the document (e.g., Ch. 2, p. 8; Ch. 2 p. 6 & 13 and elsewhere) and is defined in the glossary. DPC is an excellent BLM-developed concept that the whole range science community has now accepted and adopted. Why not make more extensive use of this concept in this major BLM document? It should be mentioned in all of the appropriate guidelines for all 3 districts.

I know that some environmentalists do not like the DPC concept and I suspect that this is why it is so little used. The following Society for Range Management (SRM) publications explain the DPC concept and basically adopt it as SRM policy. They are not cited in this DEIS (but should be)--

SRM Task Group on Unity and Concepts in Terms. 1995.
Evaluating rangeland Sustainability: The Evolving
Technology. Rangelands 17:85-92.

and

SRM Task Group on Unity in Concepts and Terminology. 1995.
New Concepts for Assessment of Rangeland Condition. J.
Range Manage. 48:871-282.

It is amazing that these important publications outlining the policies and standards of the professional Society for Range Management (SRM) are not even referenced in this document. The lack of any range science input is very conspicuous all through the document but this omission is especially disturbing.

"Impacts" on species diversity (Chapter 4)--In two places you state that one of the changes expected is "Increased Species Diversity" (Sagebrush Steppe, p. 6 & 11; Riparian, p. 8). No data are presented to indicate how or why this will happen or how diversity will be measured. Highest species diversity in a given habitat generally occurs at mid seral (low good to high fair) range conditions. The majority of your communities are now in Mid Seral or higher condition (Table 1, Appendix 7). Improving Mid Seral communities to High Seral or PNC generally will decrease species diversity for that habitat.

Table 1 in Appendix 7 indicates that 30% of total acres are in Early Seral, 42% are in Mid Seral, 20% are in Late Seral and 3% are in PNC. This indicates that the greatest possibility for increasing species diversity probably occurs only in the 30% in Early Seral condition. Increases in range condition in the 65% of the acres in Mid Seral, Late Seral and PNC probably will result in either no change or decreases in species diversity.

The Tables in Appendix 18 also indicate that you expect all 4 of the Alternatives to cause "Movement toward later seral stages" and "Increased diversity of plants and animals" (Page A18-4). Except for the 30% of area representing communities in Early Seral condition, these two statements contradict each other, i.e., movement from Mid Seral to Late Seral or from Late Seral to PNC will usually decrease species diversity in the 62% of the area in those conditions. What data do you have to indicate that species diversity will increase under the various alternatives? No species diversity data are presented in the DEIS and no methodology to measure or estimate diversity are presented.

4-8
cont. The preceding statements about species diversity are somewhat contradicted by other statements about landscape diversity. The Susanville RAC guideline 9 (Ch.2, p. 23) states that "Grazing management practices must sustain biological diversity across the landscape. A mosaic of seral stages, vegetation corridors, and minimal habitat fragmentation must be maintained." Except for fragmentation, which is a very poorly defined concept on rangelands (does it even apply on rangelands?), this is a good statement. However, it does not necessarily agree with the objective of increasing species diversity in all habitats.

The concept of a mosaic of seral stages is quite good and should be the goal of management. However, it conflicts with Guideline 2 (Ch. 2, p. 22) which states that achieving Potential Natural Communities (PNC) is the goal for all riparian zones. You cannot maintain a mosaic of seral stages if your goal is have everything in PNC.

4-9 Economics--(Ch. 3, p. 61-67)--Initially I was pleased to see sections on economics included. However, after looking at these tables and text, my reaction was "so what". The Western U.S. figures mean little in your specific areas. What do all of these figures mean? You never really talk about the impact of reducing federal AUMs on individual operations in your areas in this section. Contact Dr. Bob Fletcher (U. Nev. Reno, stationed in Las Vegas) to get some meaningful figures on this.

4-10 Economics--(Ch. 4, p. 28)--This section does contain more details on the economic impacts of grazing. It is disturbing that all 4 alternatives call for reductions of between 16,000-36,000 AUMs. I don't see the real justification for that magnitude of cuts anywhere in the document. I am not an economist but I also find it difficult to believe the assumption that a loss of 16,000 AUMs represents a loss of only 8 jobs. You unfairly minimize the magnitude of the cuts by the statement that the loss of 16-36 thousand AUMs does not represent "a significant impact...even in the 1.5 billion dollar California livestock industry". This insensitive portrayal puts these cuts in such an inappropriately large context that it tends to trivialize the major impact such cuts will have on individual livestock operators and their local economies.

4-11 "Transitional" Guidelines (# 14)--Susanville RAC(Ch. 2, p. 24)--I am not familiar with the "landscape appearance method" of determining utilization and I object to it being used to determine the "thresholds" outlined here. By its name, this certainly cannot be a very accurate, reliable or repeatable method. Specifying this method is in direct conflict with what is stated in Guideline # 15 below, i.e., that monitoring will be conducted using current accepted practices and techniques. The "landscape appearance method" is not accepted as a standard method by the range science profession. Because this method does not fit your stated goal of using accepted techniques (Guideline #15), this Transitional Guideline (#14) should be deleted.

Monitoring for trend (Guideline # 15, Ch. 2, p. 24)--This states that monitoring for trend of rangeland health will be conducted "using current accepted practices and techniques". I know what accepted practices are for monitoring for range condition and trend. These are mentioned in the section on "Quantitative Monitoring" and "Long-term (trend) Monitoring" in Chapter 3 (p. 9-13). The results of conventional quantitative methods are shown in Tables 1-4 of Appendix 07 for range condition and in Tables 5 and 6 of Appendix 7 for trend.

4-12 What are the "accepted practices and techniques" for monitoring trends in rangeland health? They are not covered in Chapter 3. If you really are talking about accepted practices for determining range condition (and trend) then state it in that way, and don't call it rangeland "health". Otherwise, you need to tell the reader what quantitative methods (not qualitative checklists) you plan to use to measure trends in health. The matrix presented in Appendix 1 came out of the "Rangeland Health" book but contains little that is quantifiable and nothing that can be used to determine trend. The switch in nomenclature from "condition" to "health" without indicating what changes (if any) will be made in methodology does not give the reader enough information for evaluation. Does the use of the word "health" in the DEIS really mean range "condition" in the traditional sense?

4-13 "Guidelines" presented in DEIS--With the major exception of the utilization tables (which must be removed from the document), other references to utilization and stubble height or residue, and the other specific things mentioned above, the "guidelines" for Bakersfield (Ch. 2, p. 9-12), Ukiah (Ch. 2, p. 16-23), and Susanville (Ch. 2, p. 22-24) generally tend to be good.

4-14 References--In addition to the 2 missing SRM "Unity" papers (see above) and the 3 attached papers on utilization, the DEIS does not cite one of the best references on the effects of grazing--
Ecological Implications of Livestock Herbivory in the West, published by Society for Range Management in 1994.
The chapter-- "Implications of Livestock Grazing in the Intermountain Sagebrush Region: Plant Composition" by Rick Miller, Tony Svejcar and Neil West-- is an excellent summary for the sagebrush type, with 13-1/2 pages of references. Some of the other chapters in this book may also be pertinent to other vegetation types covered in the DEIS.

4-15 Glossary--
Biological Diversity--this isn't the accepted definition of biodiversity. See West's invited review paper on "Biodiversity of rangelands" in the 1993 Journal of Range Manage. (p. 2-13) for a much better definition.

4-16 "Fundamentals of Rangeland Health"--see my earlier comments.

4-17 "Standards" and "Guidelines"--see my earlier comments on the incorrect use of these two words by BLM.

Carl F. Twisselman II
 Martha M. Twisselman
 9501 West Lokern Road
 McKittrick, CA 93251

August 4, 1997

DEIS team for Grazing Standards
 Bureau Of Land Management
 California State Office
 2135 Butano Drive
 Sacramento, Calif. 95825

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Comments on DEIS for S & G for grazing:

I recommend the choice of alternative 1- individuals in each area know their area best; each RAC spent a lot of time coming up with their documents. In the case of the Bakersfield RAC, the preamble is a very important part of the document and I would like it included in the final S & G regardless of which alternative is chosen, or if some consolidation is used.

Alternative 4 is not feasible and requires conditions that cannot be met. There is no evidence that their proposed changes would lead to better rangeland health, and the costs would be so high that grazing would be eliminated in many allotments.

Chapter 2, page 5-last sentence- There are many BLM parcels that have no public access so the public cannot be a participant in monitoring; maybe this line should be deleted or the meaning of "active participant" should be defined further.

Chap 2, page 11- forage utilization requirements- I have received complaints about the 4-6 inch stubble height in riparian areas. Some permittees say that the grass in their area does not normally grow to that height, or that they need to graze before that height is reached to prevent weeds from taking over.

Chap 3, page 11- "Key area concept" I have trouble with this idea- maybe from lack of understanding. It has been my belief that when measuring R D M, samples are taken throughout a pasture and an average use is determined. I would not like to see management of a large area hinge on a small key area that is subjectively chosen.

Chap. 3, page 17- I have read studies that indicate that hoof action and manure can be beneficial to soil and vegetation growth, but, throughout this draft, the negative aspects of grazing are emphasized and, in most cases, the positive aspects are left out.

Chap 3, page 20- I doubt that perennial grasses ever dominated the west side of the San Joaquin Valley; what perennial grass grows with only 4 inches of rain all of which comes in 4 months?

Chap. 3, page 25 Grazing doesn't harm the new saltbush seedlings in my area. I watched cattle and goats grazing among new seedlings, they didn't eat them at all, but grazed the mature saltbush in the same area. If you don't graze saltbush areas, wildfires will be so hot that they will kill the saltbush.

Twisselman comments page 2

- 5-9 [Chap 3 page 65- Where did you get a figure of \$5.76 per AUM for rangeland costs in 1993, did you include Ed Hastey's salary? The cash cost of 3% for ranchers must include their entire operation, not just the BLM part. Only the costs directly attributable to livestock grazing should be included in these figures, not the cost of politically driven items such as this EIS.
- 5-10 [Chap 3, page 77 - Did you get lots of offers to sell unimproved grazing land at \$2,215.00 per acre? You must be selling to the Nature Conservancy.
- 5-11 [Chap 4, page 23- I doubt that you can build fence on BLM land for \$3,000.00 per mile.

Overall, I thought that your job was very well done and appreciate the effort. The economic analyses was inaccurate, at least for the Bakersfield District, but that probably doesn't have much to do with setting the S&G anyway. Glossary was good, and very useful.

Sincerely,

Carl

Carl F. Twisselman II

2501 Lake Tahoe Blvd.
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96150
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August 11, 1997

**Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95825
attention: Rangeland DEIS**



Pete Wilson
Governor

DRAFT EIS FOR RANGELAND HEALTH STANDARDS AND GUIDELINES FOR CALIFORNIA AND NORTHWESTERN NEVADA

To Whom It May Concern:

Thank you for the opportunity to comment on the Draft EIS for Rangeland Health Standards and Guidelines for California and Northwestern Nevada. The Susanville and Bakersfield Resource Areas are the two areas, at least in part, which fall under the jurisdiction of the Regional Water Quality Control Board, Lahontan Region. We had previously sent comments on the proposed standards and guidelines to Jim Morrison on September 13, 1996.

State law assigns responsibility for protection of water quality within the Lahontan watershed basin to the Regional Water Quality Control Board, Lahontan Region (“RWQCB”). The RWQCB implements and enforces the Porter-Cologne Water Quality Control Act (“Porter-Cologne Act,” California Water Code §13000 et seq.) and the *Water Quality Control Plan for the Lahontan Region* (“Basin Plan”). All Bureau of Land Management projects must comply with all substantive and procedural requirements of the Porter-Cologne Act and the Basin Plan.

Please accept the following comments:

1. We request that the Draft EIS standards and guidelines specifically acknowledge that all grazing activities shall be managed to achieve compliance with State water quality standards. The Basin Plan contains narrative and numerical water quality objectives that have been adopted to assure adequate protection of beneficial uses. The standards and guidelines should recognize these water quality objectives (including the Nondegradation Objective), and be written and implemented to achieve compliance with all objectives.

-2-

Alternative 1: The Bakersfield Resource Area specifically acknowledges the need to meet California State water quality standards. They state: "Surface and groundwater quality complies with California, or other appropriate (e.g. Nevada or Tribal) water quality standards."

6-1

The Susanville Resource Area does not specifically acknowledge the need to achieve California State water quality standards. They state: "At a minimum, water quality is adequate for desired beneficial use of water resources on public lands." We request acknowledgement that State water quality standards need to be met with a statement much as was done by the Bakersfield Resource Area.

Alternative 2:

6-2

This alternative does not specifically acknowledge the need to meet California State water quality standards. This alternative states: "Water will have characteristics suitable for existing or potential beneficial uses." We request acknowledgement that State water quality standards need to be met with a statement similar to that proposed by the Bakersfield Resource Area in alternative 1.

Alternative 3:

6-3

This alternative does not mention water quality as a Fall-Back Standard. There should be a recognition in the Fall-Back Standards that State water quality standards need to be met.

Alternative 4: This alternative acknowledges the need to meet California State water quality standards.


6-4

For clarification it should be noted that adherence to implementation of Best Management Practices (BMPs) does not automatically ensure that the applicable State water quality standards are being met. Thus, while BMPs remain an important tool for use by the BLM to achieve compliance with State water quality standards, additional mitigation must be applied where BMPs alone would be insufficient to achieve full compliance with all applicable State standards.

-3-

Please keep Fred Blatt of my staff informed of this proposed action and submit copies of all environmental and decision documents to this office for our review. Thank you for this opportunity to comment. Please call Fred Blatt of my staff at (916) 542-5423 if you have any questions regarding these comments.

Sincerely,


Ranjit S. Gill, Ph.D., Chief
Planning and Toxics Unit

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[graze - general]

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July 31, 1997

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Bureau of Land Management
California State Office
2135 Butano Drive CALIF STATE OFFICE
Sacramento, CA 95825 SACRAMENTO, CALIF.

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Attention: Rangeland Health DEIS

Following are my comments about the Rangeland Health Standards and Guidelines:

General Comment:

As a taxpayer, it is my opinion that the effort and dollars spent on "Rangeland Reform 94" and "Rangeland Health Standards and Guidelines" would have been much more productive had it been spent to solve specific on the ground problems using existing law and regulation.

It is my opinion that the Susanville Resource Advisory Council has made a very conscientious effort in this exercise.

Specific Comments:

Page 19, preamble: Paragraph one, sentence one:

7-1

"Healthy rangelands contribute to the social and economic well being of rural communities in Northeastern California and Northwestern Nevada, and they provide over the long term, the most reliable harvest of rangeland resources."

Change the word "harvest" to "production."

Page 20 -- Standard 2, Streams

Criteria to meet Standard

paragraph 3

7-2

"The stream water surface has a high degree of shading resulting in cooler water in summer and reduced icing in winter.

I don't understand shading reducing icing in winter. Why is the frost always about twice or three times as deep on the north side of a building?

Page 21 -- Standard 4: Riparian and Wetland Sites.

Meaning that:

The riparian and wetland vegetation is controlling erosion, stabilizing streambanks, shading water to reduce water temperatures. The underlined should read: shading water areas to slow the rise of daily water temperatures.

Page 23 -- Guideline 5

7-3

This must recognize that in some cases that a very long time may be required to obtain potential natural vegetation.

Page 24 -- Guideline 14: Transitional Guidelines

Both the amended regulations and the Draft EIS transitional guidelines require immediate action if the standards are not being met. These are as follows:

4180.1 Fundamentals of Rangeland Health:

The authorized officer shall take appropriate action under subparts 4110, 4120, 4130 and 4160 of this part as soon as practicable but not later than the start of the next grazing year upon determining that existing grazing management needs to be modified to ensure that the following conditions exist.

Guideline 14: Transitional Guidelines

Due to the extended period of time that will likely be needed to initiate allotment specific analyses for terms and conditions on individual permits, the following guidelines will be applied immediately upon implementation of the Standards and Guidelines. The transitional guidelines represent the minimum necessary guidelines to prevent the most abusive grazing practices from occurring. Range site specific exemptions to the Standards and Guidelines would only be allowed in the most extreme situations (refer to preamble, paragraph 3). Transitional Guidelines will be appended to the existing land use plans.

7-4

I am not sure what conditions will require the use of Guideline 14. This will depend on the opinion of someone. Different people will look at this differently. If immediate implementation is not intended, then it should say so in the guidelines. Immediate implementation has the potential to cause heavy reductions for some allotments, thus causing rancher anger. If implementation is delayed, some other groups will become angry. This will cause a court battle which will tie up dollars that can better be spent at solving on the ground problems.

Discussion follows under a 1, 2, and 3

a 1: Riparian (permanently saturated areas of perennial streams)

Threshold: Maximum 60 percent utilization of herbaceous vegetation to be measured by the Landscape Appearance Method.

It is assumed that the 60 percent utilization is to be measured at the end of the growing season and grazing season, however, the guideline does not say that. Perennial streams will cause less conflict than small permanently saturated areas. Many of the streams in the Susanville District have been placed under restrictive grazing at the present time. Some of the use on these streams has been under controlled grazing for several or many years. Others are presently planned for more restrictive grazing. If this guideline is applied to all saturated areas, major reductions of livestock grazing will occur for some allotments and all livestock grazing will be eliminated from some areas where there are even a few wild horses. A few wild horses can keep very small saturated areas grazed very close, even where there is super abundance of forage nearby. Where there are no wild horses in some cases grazing would be eliminated by July 15 of every year.

7-5

It is my opinion that the BLM should continue to fence springs and associated saturated areas and pipe water to tanks outside the fence. Generally, a secondary riparian area can be fenced in the overflow area. Often a spring development will dry up an existing riparian area.

It is my opinion that some small seeps should be left unfenced as water sources for wild horses and burros, pronghorn, deer, sagegrouse and livestock without placing priority on riparian values. Some of these areas are very small and not feasible for spring development. Generally such areas on a grazed landscape are grazed to about 85 percent. This can occur within a day or two after animals enter the area.

7-6

Indicator: No net loss of wetlands from livestock trampling.

The problem is not the net loss of wetlands as much as it is preventing the recovery of wetlands by continued trampling by livestock

a-2: Uplands

Threshold: Maximum 50 percent utilization of perennial or native herbaceous and browse species to be measured by the Landscape Appearance Method.

Here again, the 50 percent utilization should be based on the total growth per year.

7-7

Grazing in the Great Basin in general is very uneven. The percentage of utilization measured can vary greatly from transect location. This can cause great conflict in interpretations of the guideline.

a-3. Crucial (essential) Deer Habitat

Threshold: Maximum 20 percent utilization of annual growth on key browse species prior to October 1, in identified concentration areas. This will be measured by the Landscape Appearance Method.

7-8

From my experience with BLM, I see a serious push to put Guideline 14 (Susanville) into effect, then backing off after conflicts come to a head. This places the field people open to heavy criticism. It appears to me that addressing problems on a priority basis rather than with a broad brush is a better approach.

Note that I do not approve of the gross abuse of a landscape. However, this can be taken care of with present law and regulation. In Susanville, the problem is mostly coming up with management for the sore spots, of which there are many. However, each year there are fewer of these.

Sincerely,

Bill Phillips

Bill Phillips

cc: Susanville Resource Advisory Council

COUNTY OF TULARE

BOARD OF SUPERVISORS



BILL MAZE
BOARD CHAIRMAN

August 18, 1997

Mr. Ed Haste, State Director
Bureau of Land Management (BLM)
California State Office
2135 Butano Drive
Sacramento, CA 95835

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RE: RANGELAND DRAFT EIS

Dear Mr. Haste:

As Chairman of the Tulare County Board of Supervisors, I am responding on behalf of our County to the Rangeland Health Standards and Guidelines for California and Northwest Nevada Draft EIS.

8-1 We support Alternative 1 as described in the Draft EIS.

As you know, the BLM created three Resource Advisory Councils for the areas in your jurisdiction. These councils included members of the interested public, including members representing elected officials. The elected officials: Nancy Huffman of Modoc County, Denny Bungarz of Glenn County, and myself have recommended Alternative 1 as the preferred option. In our opinion, this alternative meets the objectives of the law, the BLM, and poses the least negative effect to the cattle industry and to counties.

After considerable training on basic ecological processes, a diverse group of citizens with varied backgrounds and interests developed Alternative 1.

Your favorable consideration of our recommendation and support is appreciated.

Sincerely,


Bill Maze, Chairman
Tulare County Board of Supervisors

BUREAU OF LAND MANAGEMENT
2135 Butano Dr.
Sacramento. CA. 95825

August 20

Re: Standards & Guidelines DEIS

Whoever:

To	Initial	Date
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The main positive key in this document is the statement on page 8, "There will be no arbitrary removal of livestock. If removing livestock will not fix the problem, then livestock will not be removed."

9-1 Overgrazing by wildlife is a management problem not addressed. Where damage is due to recreation or wildlife, these activities or species (wild horses or elk) should be removed not livestock. Livestock contribute to the stability of local economy, where as wildlife and recreation often contribute to the cost of crime enforcement. This is not addressed.

9-2 Alternative 4 should not even be considered. This plan could be used by anti-grazing biased personnel. Even temporary removal of livestock may put a tremendous burden on the permittee who may have no other place to go with his animals and be forced to sell. Other unused permits must be offered to ease the burden. Any loss of ranches means loss to the local economy and loss of winter maintainance of wildlife.

9-3 The main problem in the future of BLM will be the availability of unbiased, knowledgeable and experienced personnel! Common sense and cow sense have got to be emphasized. Permittees must have the right to appeal any decision before livestock removal.

We have in the past had experience with Forest personnel who changed the utilization of a meadow from 60% utilized to 40% utilized after being shown a nearby enclosure by the permittee. Its a good thing he was there.

Another Forest personnel claimed overgrazing in an area where snow had slowed growth. She had to be shown by the permittee that grass that has been grazed is chopped off at the tip, not pointed!

9-4 Long term past management practices should be documented so that new BLM pesonnel can know what has been tried before and whether a permits trend is upward or downward.

9-5 I highly recommend the article " It May be Utilization, but is it Management?" by Earl McKinney in the July Rangelands and in the August Cascade Cattlemen.

9-6 Alternative 1 is the least objectional. There is still no way an inexperienced manager could use this Standards and Guidelines without practical knowledge and local advice.

Since weather is the main variable, changes should be long term and not as drastic as in Alternative 4.

Sincerely

Bob Wilson
33201 E.C.V.
CARMEL VALLEY
CALIFORNIA
93924



August 20, 1997

BLM
California State Office
2135 Butano Dr.
Sacramento, CA 95825

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Re: Comments to the Draft EIS for Rangeland Health Standards and Guidelines for California and Northwestern Nevada, May 1997.

To Whom it may concern:

California Trout, Inc. would like to take this opportunity to thank the Department of Interior, Bureau of Land Management for the great effort they have undertaken to adopt Standards and Guidelines for the health of the Rangelands under their jurisdiction. We would also like to thank the participation of all of the individuals who helped in preparing the RAC recommendations used in this document.

10-1 One major overriding concern that we have with this document is that it seems to be an exercise in which measurable, quantifiable results will never occur. We realize that the direction that was given to the State offices of the BLM centered around setting Standards and Guidelines for the State, but these will have little if any effect if they are not made measurable, and repeatable, and lead to changes in grazing management for the health of the rangelands. There are only a few places in the document that speak to time frames for implementation, where it is suppose to take 15 years to implement Alternative 1 and 5 years to implement Alternative 4. We would like to know when effectiveness monitoring will occur to determine if management changes are necessary to reach the desired outcome. We would like to know how soon the different Standards and Guidelines will take effect. We understand that it is the intent of the BLM to incorporate the new Standards and Guidelines as soon as the decision is made, and we compliment you on this strategy. Although, there are still problems with how soon the inventories of the allotments will be completed, so that there is little miss-understanding about what is generalized comments in the DEIS, and what is based upon actual data.

10-5 By reviewing the Alternatives in this DEIS, California Trout would like to recommend that the BLM use Alternative 4 for its preferred alternative. If you read your summary of Alternative 4, on page 2-31 it states: "Alternative 4, in contrast to the other alternatives, would ensure that any identified problems are corrected as fast as possible rather than taking a gradual, incremental, approach toward improved management. Alternative 4 is designed to promote sharp improvement in trend toward rangeland health within one to three years on favorable sites (e.g. riparian areas or wetlands). Appropriate action could include exclusion of livestock; changes in allowable forage utilization, the season of use,



California Trout, Inc. comments on the BLM Draft EIS on Rangeland Health

2

the timing or duration of that use; a combination of these or other actions; or any other management action that would accomplish the goal of properly functioning and healthy rangelands. Depending upon the site's potential, many sites may fully recover within this time period others may require a longer time period."

10-5
cont.

"As a first step under this alternative, an assessment of every allotment would be undertaken to determine where the standards are not being met. If current livestock grazing practices are resulting in rangeland and riparian areas not meeting one or more of the standards, BLM will adjust livestock grazing before the next grazing season. Monitoring of all allotments would be continued annually, and BLM would make continued adjustments annually if necessary to ensure that trends are sharply upward, and that management is resulting in the most rapid progress possible toward rangeland health." This quote seems to be a good definition of what rangeland management is suppose to be. In fact a lot of the direction seems to come directly from existing regulations and laws already on the books. Why is there any other alternative provided in this document? With all of the existing laws and regulations already on the books (Appendix 3) it seems that if the agency obeyed the law, we would not have the problems that exist today.

10-6

For the BLM to gain back its integrity with the general public and with the permittees, there is a need for this document to measure quantifiably, existing condition, movement toward the Desired Future Condition, and health of all of the resources present in the BLM managed Rangelands. We need to understand when things are going to happen, and if effectiveness monitoring shows that changes need to be made when they will occur.

10-7

This document should also include an enforcement section so that everyone knows from the start what actions the agency will take if terms and conditions of the permits are not met.

10-8

Without using strict, quantifiable language in writing these standards and guidelines there will be little if any agreement on when a standards or guideline is or is not being met. The wording throughout this document gives little scientific credibility by using words like; appropriate levels, is sufficient, is evident, is diverse and appropriate. What do these terms mean? Perhaps, the agency could define what they mean, or give actual figures to use for comparisons. For instance when you are taking about age-class and structure of woody/riparian vegetation, instead of saying that it will be diverse and appropriate for the site, it might be better to say that ____% will be in late seral stage, ____% will be in mid seral stage, and ____% will be new recruitment. Without these further definitions of the terms included in this document it will not only never be understood, it will lead to misunderstanding amongst your concerned parties.

For ease of review the following comments will follow the format of the DEIS.

CHAPTER 1

1.6 Public Scoping, Issues

10-9 The major issues listed on page 6 of the DEIS speak of some of the concerns that we have already pointed out and we feel that the BLM has done little if anything to answer them. A lot of these concerns #2,8, and 11 all speak to the point of making terms quantifiable, presenting time frames for completion, and using only documented scientific research. When does the agency plan on doing this?

CHAPTER 2

2.4 IMPLEMENTATION

10-10 Page 2-2 states that "The authorized officer shall take appropriate action as soon as practicable but no later than the next grazing year upon determining that grazing practices or levels of grazing use on public lands are significant factors in failing to achieve the standards and conform to the guidelines..."(emphasis added), (43 CFR 4180.2)). This to us seems like it is a must for you to finish your analysis of the condition and trend of all of the allotments under your jurisdiction. It also seems that if this rule is to be enforced that Alternative 4 is the only alternative that will bring you into compliance. On page 4-3, of the EIS it says that currently only 16% of your allotments are not meeting one or more of the fundamentals for rangeland health, yet 38% of the allotments in the study area have not been analyzed as of yet. We have problems with some of the other figures presented in this document as to the actual health of the rangelands when figures using the Proper Functioning Condition assessment point to over 69% of the Lotic and Lentic habitats are either not functioning or functioning at risk. How can the BLM determine then that only 16% of its allotments are not meeting the fundamentals of rangeland health? This goes completely against the fundamentals which state that watersheds are properly functioning, or water quality standards are being met, and habitats of aquatic protected species are in order. Finish your analysis before you make any more assumptions as to the health of the rangelands under your jurisdiction. Failure to do this will only lead to misunderstanding between the agency and the interested publics.

10-12 On page 2-6 of the DEIS it states; "Successful application of these standards and guidelines will depend on BLM's capacity to monitor rangeland conditions and implement management practices." BINGO!! Now when does the BLM intend on doing this?

D-13 As we discussed earlier, the public needs to know the definition of some of the terms used in this document. When you talk about appropriate amounts of something what is that appropriate amount? How much ground cover is appropriate? Is it 80,90, or 100%? What constitutes ground cover? What are the water quality constraints listed in the individual Basin Plans, and where do they comply. Are the "Beneficial Uses," listed in the Basin Plans actually used as standards for enforcement? For example if the beneficial use is listed as cold water fisheries, then does the BLM protect them through measurement of temperature, turbidity, contamination, streamside vegetation, and streambank stability? Does the BLM plan on asking the Regional Water Quality board to certify permits re-issuance by acquiring a 401 certification through the Clean Water Act?

10-14

BAKERSFIELD STANDARDS FOR RANGELAND HEALTH

10-15 Page 2-6,7. Again we mention that the use of terms that can not be measured except with "Professional Judgment," will serve little benefit to this process. "Precipitation is able to enter the soil surface at appropriate rates. . . soil fertility is maintained at appropriate levels. . . litter/residual dry matter is evident, in sufficient. . . A diversity of plant species, with a variety of root depths, is present and plants are vigorous during the growing season." Please include definitions and quantifiable measurement criteria for these statements in the Final EIS.

10-16 Riparian: Standards. The only two vegetation attributes that make any sense are where vegetation cover is greater than 80%, and that point bars are vegetated. The rest are again not quantifiable. Does the agency plan on doing the water quality monitoring listed under
10-17 the standard of Water Quality to ensure compliance with the Clean Water Act? Does this
10-18 also mean that a minimum riparian zone will be established where little if any management will occur? When do the Clean Water Act regulations apply? If the beneficial use of the
10-19 waters listed in the Basin Plans are not being protected you are in violation. Most of the watersheds under your jurisdiction are defined as recreational contact sport waters, do you plan on doing nutrient load testing, macroinvertebrate, or fish sampling to determine if you are protecting these waters.

10-20 A major contention on our part is the downstream effects of your management actions. If you allow use of the riparian zone for grazing, the non-point effects will have a detrimental effect on the watershed. This may occur as increased sedimentation to the watershed, which will cause serious effects to the aquatic organisms in the stream, and will change the biological attributes of the watershed. To be in compliance with the Clean
10-21 Water Act, you have to insure the integrity of the nations waters chemically, physically, and biologically. There is no information given in this document to determine the downstream effects of your actions on the watersheds.

SUSANVILLE RAC GUIDELINES FOR LIVESTOCK GRAZING

10-22 We commend the Susanville RAC for Guideline #1. This guideline if enforced in one in which the condition of the riparian zone will be measurable at the end of the grazing season. There is contention amongst the parties as to the value of leaving stubble heights in the riparian zone. The California Cattlemen's Association asks you to review the article in Rangelands, Volume 18, Number 4, where the authors state that lower stubble heights trap more sediment. This same article states that longer stubble heights lay over and help in armoring the streambank, thus protecting the watershed not only by trapping sediment, but by preventing collapse of the streambank. This same conclusion is drawn in two other articles that should be reviewed. Managing Grazing of Riparian Areas in the Intermountain Region, Clary and Webster, General Technical Report INT-263, May 1989, and Grazing and Riparian Management in Southwestern Montana, Lewis H. Myers, BLM, Dillion Montana.

10-23 Guideline 2, has problems because it uses the goal of achieving Potential Natural Community (PNC) for the riparian zones. This will be hard to implement if the agency does not know what the PNC looks like. Has the agency done an inventory of the different ecosystems present on their lands? This is also going to be difficult to enforce, because the definition of a PNC indicates the way a stable community will look without the influence of man. However, this guideline identifies a desired seral stage in the presence of livestock. The two do not go together. You will not be able to meet PNC without removing all influences of man, livestock included.

10-24 Guideline 6, calls for the same requirements that we request, measurable terms and conditions. When or where are these going to be presented? If they are to be presented in the site specific analysis, then the agency needs to give minimum standards that will apply throughout the district, until that occurs.

10-25 Guideline 8, in all of our research on aquatic systems, and their continued health, there is no strategy present today that will provide for habitat requirements for fish and wildlife, except exclusion of livestock.

10-26 Guideline 13, The recent work by Dr. Nancy Ermin of University of California at Davis, (SNEP) points out that these same springs, seeps and bogs may be the only population of rare macroinvertebrates. Does the agency plan on doing inventories of these sites before allowing the destruction of rare species that may be present? There could also be a severe impact on fish and wildlife from development of these sites. The agency needs to take a harder look at these areas to determine if the fish and wildlife will be placed in jeopardy resulting from such actions.

10-27 Guideline 14, our evaluation of this guideline indicate the use of utilization levels that are too high to enable recovery or maintenance of rangeland health. We believe that using a cross section of the scientific literature that between 30-40% utilization should be the recommended levels. The only references we have seen that use higher rates of utilization are from traditional range science sources like the University of California COOP Extension Service. What the agency needs to incorporate in rangeland analysis is an interdisplanery review to ensure that all of the resources receive a fair assessment. Fish need different safeguards then do livestock to sustain the resource.

10-28 We feel that the Susanville RAC was the only group to recognize the problem of timing. We feel that all of the Districts should have the same requirement of imposing a set of guidelines that operate while the site specific guidelines are developed. Although we feel that guideline 14 is to lenient, it does although require some sort of protection until further NEPA analysis can occur on a site-specific level.

ALTERNATIVE 2: STATE-WIDE CONSISTENCY

10-29 The standard for all riparian areas regardless of RAC area should be in an upward trend if they are functioning at risk or nonfunctional. This should be a standard that is applied in

all of the alternatives. In TR 1737-9 1993 and TR 1737-11 1994 publications regarding Proper functioning condition, the BLM was given the chief goal of seeing that 75% or more of its watersheds would be in a PFC by 1997. If you are going to take this direction to heart, the only solution seems to be adopting alternative 4.

CHAPTER 3

3.4.2 WETLAND-RIPARIAN VEGETATION

10-29
cont.

As you indicated on page 3-41, all of the wetland-riparian areas on BLM lands have experienced overgrazing in the past. You also state that you have not finished the inventories of your allotments as of yet. Your goal seems to be wrapped up in the statement made on this page; "Improved management of wetland-riparian vegetation is one of the goals of the healthy rangelands initiative." My understanding is that if you do get 75% of your watersheds in PFC by this year you will have to act quickly. We believe that the quote from Kattelmann and Embury (1996), is right on the mark. Before you can reach your goal of 75% in PFC we believe you will need to finish your inventory work. When this job is completed, the next requirement is to protect that condition or strive to reach it as soon as possible. The only way we can see this happening is to implement Alternative 4.

CURRENT CONDITIONS

10-30

On page 3-44 you state that in 1996 a query of the involved Resource Areas was conducted regarding the problems dealing with non-source pollution and that they seem to be general in nature. What does that mean? Does that mean that you are in compliance with the Clean Water Act or not? You continue this contention on the next page where you say, "Until recently the emphasis of most water quality studies has been on point sources of pollution, and there is, therefore, not yet a complete assessment of non-point source problems, particularly those related to livestock grazing on public lands." With the recent lawsuit in Oregon regarding the USFS and non-point source pollution and livestock grazing, the 9th Circuit Court of Appeals ruled that the USFS needed to acquire a 401 certification for all grazing permits from the State Regional Water Quality Board. This certification was to review the use of Best Management Practices (BMP's) and if through their effectiveness monitoring they could show changes in management where the BMP's failed to protect the site. A similar lawsuit is under way dealing with the Dept. of Interior here in California. Is it the contention of the BLM to have Regional Water Quality examine all of the grazing permit analysis records in order to issue a 401 permit to the permittees? We also wonder how you can be in compliance with the Clean Water Act, when to date you do not have BMP's that satisfy the EPA?

10-31

We could find no guidelines relating to what the BLM will do if the permittees fail to meet their conditions of their permits. What is the agency going to do if permittees fail to meet the soil standards, the utilization standards, or in some way exceed the set standards? Here is where we believe that the agency needs to set enforcement standards to ensure

10-31
cont.

that S&G's are being met, and what will happen to the permittee if they are not. We feel that there needs to be flexibility here, where if a permittee is trying to comply the administrator can give them a break. If on the other hand, there is no indication of a desire to comply the administrator can lower the boom. This should be a tiered response, i.e. if in the first year utilization is exceeded there is a 25% reduction in numbers, or season of use. If this continues for another year possibly a 50% reduction is necessary, and if it goes on from their possible loss of permit is required. The rangelands will not get better unless everyone knows that you mean business and that failure to comply with the S&G's means the possible loss of their permit and privilege to use the public lands.

3.5.4 RIPARIAN, WETLAND, AND AQUATIC COMMUNITIES

FISHERIES

10-32

With the BLM in California and Northwestern Nevada containing 3500 miles of streams and 62,000 acres of lakes and ponds, the agency needs to be very sensitive to the aquatic resources under its control. It is stated that "the condition of BLM aquatic habitats has not been rigorously inventoried or classified, but has been evaluated through the process of proper functioning condition assessments." This is very interesting, because the PFC analysis does not lend itself to assessment of the aquatic ecosystem. The PFC analysis was developed to look at the watershed and how that watershed could handle increased winter flows, and still remain in its channel. In all of the work we have done using this assessment it give little if any credibility to the statement that aquatic ecosystems are analyzed sufficiently using this analysis. Most scientists agree that the PFC analysis is not quantifiable not repeatable, and does nothing to assess aquatic health. If this PFC analysis were doing an assessment of aquatic health then it would ask questions regarding the temperature of the water, the chemical composition of the water, percentage of overhanging banks, width/depth ratios of the watershed, composition of the substrate, size of the bed material, oxygen content of the water, amount of large woody debris present, health of the riparian zone, amount of sediment trapping occurring due to riparian vegetation, percentage of overland flows into the stream, etc. The list goes on and on and there is no way that BLM can assess the quality of their aquatic habitats using only the PFC analysis. You already point out that over 69% of your Riparian Wetland areas and watershed are in a Functioning at Risk category. If these areas are functioning at risk with an assessment that only looks at the watershed health issue, you can not determine that aquatic habitats are healthy.

3.11 ECONOMIC CONDITIONS

10-33

"Changes in the BLM grazing program have the potential to economically affect livestock operators, local governments and communities, as well as the expenditures of the BLM rangeland management program." What is left out of this statement is that non-consumptive use of these same lands can have as big an influence on the local economy. A recent study by the University of California at Berkeley states that recreational fishing is worth approximately \$12 billion dollars annually to the state, and employs over 150,000

10-33
cont.

people. Would you please include a section in the final EIS showing the impacts to other sections of the economy if non-consumptive uses or alternate uses take precedence over existing status quo use.

We would like to compliment the agency for the rest of the data that is presented in this section. We believe that you gave a fairly accurate accounting of the value of the rangeland under your jurisdiction.

CHAPTER 4

4.2.1 GRAZING MANAGEMENT

10-34

As we discussed earlier we have a problem with the agency using figures that they cannot substantiate. It is stated that only 16% of your allotments are currently not meeting one or more of the fundamentals for rangeland health, which consists of 82 allotments from the 705 you administer. On the other hand, the next page states that 38% of these same allotments are not included in the analysis. How can you state that only 16% of the allotments do not meet the fundamentals for rangeland health when you have only done an inventory of a little over half of them? Again, this does not correlate with the percentages of watersheds in the Functioning At Risk category.

10-35

"In all alternatives there would be a need to implement or install range improvement projects to facilitate the enhancement of vegetative conditions either through vegetative treatment practices and weed control or to place facilities on the rangelands to support the grazing management of livestock. Many of the areas known to be in need of these projects are within Wilderness Study Areas or designated Wilderness Areas." Just wait a minute here, your direction stated in the previous chapter states; "1964 Wilderness Act, the Federal Land Policy and Management Act of 1976. . . These acts generally direct BLM to manage wilderness areas so their natural condition is preserved and the human influences in the area are substantially unnoticeable." I know that the Forest Service has just reversed a decision regarding the building of stock tanks and facilities in the Aldo Leopold Wilderness in New Mexico regarding this same issue. It seems that the Department of Agriculture feels that even though grazing might have occurred in a Wilderness Area prior to the Act, it still does not agree that the grazing of livestock is a historical use. Therefore, the other provisions of the Act take precedence, and their major view is that the natural condition be preserved and human influences are substantially unnoticed.

4.2.2.1 SOILS

10-36

". . . the Susanville RAC Area has at least three grazing allotments that resource managers suspect will not meet the soil condition standards regardless of which alternative is implemented." What does this mean for future management? Does it mean that since these areas are already degraded, we should allow them to become nuclear zones? Or does it mean that the Agency will take action to close the allotments until the time occurs

California Trout, Inc. comments on the BLM Draft EIS on Rangeland Health 9

10-36
cont.

that they might recover? It seems that your direction in this matter is clear, rest the allotments and hope that time will recover the sites.

4.2.2.2 VEGETATION**ANNUAL GRASSLANDS**

10-37

"Episodic recruitment of oaks and shrubs will be allowed to occur. . . during critical period of establishment." What is the critical period of establishment? If we are having a problem of recruitment regarding Blue Oaks in the foothills of the San Joaquin Valley, we need to know what is going to happen with the competition of grasses for available water, and the problem with soil compaction?

4.2.3.1 RIPARIAN-WETLANDS AND STREAM CHANNELS OVERVIEW

10-38

Please explain how the PFC analysis can also be used to estimate change in health status? Is this because if a watershed is in PFC vs. non-functioning you can use professional judgment to say yes it is in a healthier status? This same point was raised concerning the habitat for aquatic species. The PFC analysis does not do anything more then predict the health of the actual physical watershed, nothing more and nothing less.

4.2.3.3 RIPARIAN HYDROLOGY AND WATER QUALITY

10-39

"An assumption is made for this analysis, that numerical drinking water objectives would not normally apply to water bodies influenced by livestock grazing activities." We completely disagree with this assumption. Water travels downstream and all activities are going to have a cumulative effect on the downstream water quality. Having the responsibility to maintain the California and Nevada water quality standards, you should read the Water Basin Plans and comply with the standards set in them.

4.2.4 WILDLIFE**WETLAND/RIPARIAN HABITATS**

10-40

Rosgen and others like Platts, Ohmart, Menke, Cleary, Webster, Myers, and Holecheck all agree with the first statement in this paragraph. In fact the Behnke and Zarn state that degradation of Streambanks by livestock is one of the principle factors contributing to the decline of native trout in the west. We would like to see how Dave Rosgen can validate the second quote that you use in this paragraph.

4.2.2.4 FISHERIES

10-41

Platts (1990) states that "consideration of streamside zones in the development of grazing strategies provides the best opportunity for the development of compatible grazing strategies." Platts also says in his paper given to the forty-third North American Wildlife Conference that "McGowan (1976) doubted, as I do, that present grazing strategies are capable of solving the problems in the aquatic environment caused by grazing." He goes on to say in *Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats* by William R. Meehan Editor, American Fisheries Society Special Publication 19, 1991, that "Before progress can be made in improving the management of riparian areas, however, riparian environments must first be accepted as discrete management units and receive specialized, site-specific considerations." When the BLM recognizes that the riparian zones that they manage are important for all the resources they administer, then perhaps grazing management will be curtailed in areas where past/ongoing problems occur.

4.2.8 WILDERNESS

10-42

"... building additional livestock developments such as water structures and fences increases the number of man-made facilities in the wilderness or WSA. These developments would require the occasional use of motorized or mechanized equipment for maintenance. Both the developments and use of equipment reduce the naturalness of the area and the opportunities for solitude away from human intrusions." Please re-read comments on Wilderness in Chapter 3 comments.

4.3.1 GRAZING MANAGEMENT

10-43

The BLM has concluded that rapid recovery of the ecosystems they administer would require approximately \$800 thousand dollars over 5 years statewide in program costs. BLM has also concluded that about 10 jobs and \$1 million dollars would be the cost to the ranching community to implement rapid recovery as opposed to the proposed alternative. What will the local economy gain if rapid recovery occurs? This is in respect to all of the other values that the rangeland resource influence. Platts states that "proper management of livestock will increase resource values and, in turn, economic benefits to all users. A short-term loss of forage for livestock may occur when overused and degraded riparian communities are put under proper management, but increased forage production should ultimately be a result of improved resource management." Perhaps the Agency could use the money to be used for fencing an additional 248 miles of rangeland. This is one area the public does not like, it is the responsibility of the permittee to herd cattle and sheep out of areas where they are causing problems, not the responsibility of the tax payer to pay for additional fencing and maintenance of that fence. We believe that better management is the cure, and fences should only be used as a last resort, and only on a small scale.

10-44

As a final comment we would like to quote a statement made by William R. Meehan in the book he edited called *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats*. "The basic premise for any fisheries or fish habitat management program should be protecting the habitat from any management effects that would

California Trout, Inc. comments on the BLM Draft EIS on Rangeland Health 11

10-44
cont.

degrade it is preferable to mitigating the effects or rehabilitating the habitat after resource damage has occurred. Habitat protection is generally less costly in the long run than habitat restoration, and is usually effective in maintaining the quality and productivity of the habitat; rehabilitation of damaged habitat may not necessarily restore it fully to its original condition."

CONCLUSIONS

Again, California Trout wants to thank the members of the RAC committees and the BLM of California for doing a lot of good work in developing this document. We do have a lot of concerns that were presented in these comments. We hope that the Agency takes many of them to heart and makes revisions in the Final EIS.

10-45

Clarify, the language used and give definitions of what they mean. Use quantitative figures whenever possible to remove vagueness. Provide time frames for implementation.

10-46

10-47

Do not use figures that you can not validate. Do a complete economic analysis using

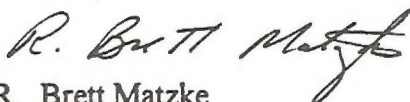
10-48

figures for all of the affected resource values included in the Rangeland analysis.

10-49

We would like to recommend that the Agency adopt Alternative 4 as the preferred alternative. We believe that the American public the owners of the Public Lands want the land to recover the fastest way possible, and that the small inconvenience to the public lands grazing community is a small price to pay.

Sincerely,



R. Brett Matzke
Sierra Nevada Manager
California Trout, Inc.

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

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August 18, 1997

Mr. Ed Hastey, State Director
 BLM, California State Office
 2135 Butano Drive
 Sacramento, CA 95825

To	Initial	Date
1 SD		
2 ASD		
EA		
3 ECO		
LE		
Minerals		
Supt Svcs		
Return To _____		
Library _____		

Dear Mr. Hastey:

I have enclosed my reviews of the draft EIS "Rangeland Health Standards and Guidelines for California and Northwestern Nevada" and Dr. W. A. Laycock's review of the document. Consider this letter and my reviews official and use them however you wish. I have sent Mr. John Willoughby over 50 studies that relate to the residue issue and some of Dr. Laycock's other comments. I have put 50-60 hours of my time into this task. I have sent all my comments to Dr. Laycock.

11-1

An overwhelming number of range studies show soil, watershed, and forage plant health are closely tied to residues (read various enclosures). Therefore, I believe if there must be standards, minimum residues make more sense than any other rangeland characteristic since its the key element in soil stability, watershed health, fish and wildlife habitat, and esthetic appearance. Further it is the key to preventing downward trends. A recent paper by leading range scientists suggests that the public considers standing biomass to be much more important than species composition (Heitschmidt and Walker 1996, Rangel. J. 18:194-215). The key point here is to strike a reasonable balance between

11-2

what is practical for the rancher and what is needed to sustain the environment. I have suggested it might be reasonable to allow ranchers to exceed minimum residues or stubble heights 3 years out of 10. Further I have suggested that ranchers be allowed to exceed minimum residues or stubble heights on 3 out of 10 key areas during any particular year. This allows some management flexibility. The critical point here is to avoid having the same key areas out of compliance with residue minimums in year after year.

Residue based range management takes far more skill than prescription based management based on my experiences. However if there is adequate flexibility in the standards it can be a great approach to improving both rangeland and rancher welfare. However I emphasize that adequate flexibility is critical.

Mr. Ed Hastey
Page 2
August 18, 1997

11-3

It is my hope that you and the RAC's will read the various papers I've sent you along with those from Dr. Laycock and then formulate their own objectives and monitoring plan based on science, equity, and social demand. I also suggest you solicit opinions from other professionals in soil, watershed, wildlife, and range sciences. While I liked the concept of using residue as basis for management in your draft EIS, keep in mind I am merely a scientist and educator and not an authority figure. It is my belief various viewpoints and ideas should be considered in drafting EIS documents.

In New Mexico residue and stubble heights are becoming a primary goal and basis for management on public rangelands. A recent court injunction on grazing on Forest Service lands (see enclosure) in New Mexico reflects what is happening. I have enclosed papers by Heitschmidt and Walker (1996) and Brown (1991) to provide alternative perspectives on residue to those of Dr. Laycock. Without question residue standards are one of the surest ways to end year after year heavy grazing on public lands. However I have never advocated the idea because it can cause undue hardship for the good ranchers if implemented without adequate flexibility.

In closing I appreciate the opportunity you have given me to review the draft EIS and respond to Dr. Laycock in spite of the time requirement. Thank You.

Sincerely,

A handwritten signature in cursive script, appearing to read "Jerry L. Holechek".

Jerry L. Holechek
Professor, Range Science


Enclosures

MANUSCRIPT REVIEW

TITLE: Rangeland and Health Standards and Guidelines for California and Northwestern Nevada Draft EIS

AUTHOR: United States Department of Interior: Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95825

DATE: August 18, 1997

REVIEWER: Jerry L. Holechek, Ph.D. 
Professor, Range Science
Department of Animal and Range Sciences
Box 30003
New Mexico State University
Las Cruces, NM 88003

**REQUESTOR
OF REVIEW:** Ed Hastey, State Director
BLM - California
2135 Butano Drive
Sacramento, CA 95825

**TYPE OF
REVIEW:** Official

COMMENTS:

1. Title:
I suggest "Objectives and Standards" rather than "Guidelines and Standards."
2. Background:
 - a. In my opinion objectives and standards would be better than guidelines and standards. What do you want to accomplish?

11-4

11-5 [b. Fundamentals of Rangelands Health
Range health should be related to both ecological condition and soil vegetation cover in my opinion. Limited research indicates late seral communities (55-70% of climax remaining) will best meet the range health criteria described on most western rangelands.

11-6 [c. Standards and Guidelines
Check definitions - A guideline is a broad measurement of something used for guidance. Standards are rules used to impose regulation authority.

11-7 [d. Process of Establishing Standards and Guidelines
Shouldn't rangeland, wildlife, watershed, and soil scientists be included on the RAC's?

11-8 [List the specific objectives of the RAC.

e. Public Scoping Issues
This section seems okay, however the issues read more like objectives.

11-9 [f. Assumptions
Shouldn't this section be titled - Approaches?

g. Issues not Addressed
This seems okay.

h. Analysis Area
This section seems okay.

i. California Desert Area
This section seems okay.

j. Other Plans and Legal Framework
These sections seem okay.

3. Description of the Alternatives

11-10 a. Guidelines in page 9 are really objectives.

11-11 b. Table A on page 11 - a more current reference would be:
Holechek, J. L., R. D. Pieper, and C. H. Herbel. 1995. Range Management Principles and Practices. 2nd Edition. Prentice-Hall, Upper Saddle River, NJ.

d. Ukiah Guidelines for Livestock Management

This section is okay. I like the idea of using a variety of management practices to accomplish objectives.

e. Susanville Guidelines for Livestock Grazing

11-12 What is the Landscape Appearance Method? Is this an accepted technique published in a peer reviewed journal?

Specifically how will residues be monitored?

f. I have no problem with how Table D on page 33 will be used. Basically it is back-up mechanism to deal with possible overgrazing problems.

4. Affected Environment

a. Generally this section is well written and well directed.

11-13 b. I consider the key area-key species approach to monitoring to be sound. It has been widely and successfully used on BLM lands in New Mexico.

11-14 c. The discussion on pages 13-16 is well directed. Heitschmidt and Walker (1996, Rangel. J. 1:194-215) provide an interesting discussion on this subject. On page 218 they suggest society's acceptance of given grazing practices primarily depends on standing biomass rather than species composition. The best way to avoid downward trends is to maintain adequate residues and stubble heights (see Thurow et al. 1988, JRM 41:296; Rhodes et al. 1964, JRM 17:185). There is no doubt that residue approaches work well for rangeland health. However ranchers tend to resist it on public lands because it can result in termination of grazing at times unfavorable to them and cause financial losses if implemented without adequate flexibility. The issue here is to strike a balance between rangeland conservation and rancher welfare. I consider it reasonable to reduce livestock numbers or apply some other

11-14
cont.

management change if stubble guidelines were exceeded more than 3 years out of every 10 years or 2 consecutive years in a row. Here I am referring to the average for key sites across the allotment. For individual key sites it seems about 70% of them should meet minimum stubble height guidelines in most years. This allows a rancher some flexibility in drought years. Generally under use in wet years will compensate for moderate overuse in dry years. However repeated overuse will damage most rangelands. Monitoring stubble heights allows range managers and ranchers to identify areas receiving consecutive years of overuse and make adjustments.

5. Soils

This section seems okay.

6. Vegetation

This section reads well and seems okay.

7. Upland Conditions and Trends

Tables 1-7, Appendix 7 are informative. They indicate some progress in improving ecological condition. However the fact only 23% of the total is late seral or climax is low from my point of view. In my opinion a reasonable goal might be 50-60% in late seral or climax ecological condition.

11-15

Pages 37-38 - Although research is limited on this subject, available studies indicate a late seral stage with 55-70% of climax will best meet multiple use needs (see Holechek 1996, Rangelands, Vol. 18, April p. 52) in most arid and semi-arid areas. Areas in early and mid seral stages often have inferior soil cover and produce much less forage for livestock than those in late seral condition. On seeded pastures, annual grasslands and forest areas ecological condition is not very useful as a measure of rangeland health.

8. Riparian - Wetlands and Stream Channels

11-16

Could outside funding from environmental groups be used to fence critical riparian habitat?

11-17

Will rest-rotation, deferred rotation, etc., systems permit riparian zone improvement? I suggest this be discussed.

9. Water Quality

This section seems okay.

10. Wildlife

- 11-18 a. I suggest more discussion on upland game species. How are populations of the different species (particularly sage grouse and mountain quail) holding up?
- 11-19 b. I suggest the primary threatened and endangered species be listed in a Table.

11. Recreation, Wilderness and Cultural Resources

I had no problem with these sections.

12. Economics

- a. This section is interesting and important. I believe it does a good job in showing the economics of public land grazing.
- 11-20 b. Information on the net returns per animal unit and per acre for the grazing districts covered by the EIS would be useful.

13. Impact Analysis

- a. Generally this section reads well and is sound.
- b. Ranching communities - p. 21
- 11-21 c. Upgrading ecological condition of the area covered should increase grazing capacity over time. Will ranchers be given additional AUM's if forage production increases? This needs to be addressed in the EIS.
- c. Grazing Management - p. 21-23
- 11-22 d. I have no major problems with this section, but I do wonder how the reduction of 16, 267 AUMs was determined.
- d. Impacts on Individual Operators
- 11-23 e. Is there any way ranchers losing AUMs can be compensated for their loss? There should be assurance AUMs can be increased if meaningful increases in forage production occur through time.

14. Consultation and Coordination

- a. This section generally seems okay.

- 11-24 b. I suggest at least 1 each range, wildlife, watershed, and soil scientists be put on the RACs.


15. Appendices

This section seems in order.

16. Overall Evaluation

- 11-25 I think overall this is a good document. I think there should be more specifics on how monitoring will be conducted. I commend the RAC's for using residue as basis for monitoring, but feel strongly there should be some flexibility allowed with this approach. This flexibility needs to be carefully thought-out and specifically stated. I have previously given suggestions on what might be reasonable flexibility based on my work with ranchers, range conservationists and county governments here in New Mexico. Condition and trend data are quite useful and needed but are costly and difficult to collect. The best way to prevent downward trends and maintain soil, watershed, wildlife, and esthetic values is to maintain adequate vegetation residues.

**SOME COMMENTS ON DR. LAYCOCKS REVIEW OF
"RANGELAND HEALTH STANDARDS AND GUIDELINES
FOR CALIFORNIA AND NORTHWESTERN NEVADA"**

By: Jerry L. Holechek, Ph.D. 
Professor, Range Science
Department of Animal and Range Sciences
New Mexico State University
Las Cruces, NM 88003
Phone: 505-646-1649

To: John Willoughby
Ed Hastey
USDI-BLM
2135 Butano Drive
Sacramento, CA 95825

Dr. W. A. Laycock
Professor Emeritus
Department Rangeland Ecology and Watershed Management
University of Wyoming
Laramie, WY 82071

Date: July 30, 1997

* This response was requested by John Willoughby, State Botanist, BLM, California.
** Consider this an official response.

A. Dr. Laycock charges that I misused research in preparing the table on utilization guidelines for different rangeland types. Some key counter points are:

1. The utilization guideline table has been published in two refereed journal articles, two textbooks (Vallentine 1990, Holechek et al. 1995), 1 invited proceeding article, and has been cited in several refereed journal articles and textbooks.
2. I had the table reviewed and approved by several leading range scientists before submitting it for peer review in refereed journals (Rangelands, Journal of Soil and Water Conservation).
3. The utilization guidelines in the table were not intended to be limits, and I have made no statements recommending that they should be limits.
4. Gray used the same approach in his 1968 textbook, "Ranch Economics."

B. Dr. Laycock claims that the following statement by Holechek 1991 is not supported by scientific evidence and is contrary to the opinion of most current range scientists.

Holechek 1991 statement: "However in most cases it (50% utilization) causes range destruction in the rugged, arid ranges of the West."

In my opinion Dr. Laycock is contradicted on this point by the following papers (posted with John Willoughby, BLM, CA):

1. Pickford and Reid 1948
2. Johnson 1953
3. Klipple and Costello 1960
4. Paulsen and Ares 1961
5. Beetle et al. 1961
6. Houston and Woodward 1966
7. Smith 1967
8. Hyder 1953
9. Skovlin et al. 1976
10. Martin and Cable 1974
11. Hughes 1990
12. Hughes 1982
13. Clary 1995

C. Dr. Laycock claims that imposing light levels of grazing on most western ranges will not result in faster recovery than will occur with moderate levels of grazing in the proper season.

This generalization is not valid if a careful evaluation is made of the long term grazing studies. Although in some cases Dr. Laycock's statement holds, I believe it is contradicted by the following studies:

1. Skovlin et al. 1976
2. Klipple and Bement 1961
3. Sims et al. 1976
4. Paulsen and Ares 1961
5. Johnson 1953
6. Smith 1967
7. Smoliak 1974
8. Valentine 1970
9. Beetle et al. 1961
10. Lewis et al. 1956
11. Taylor et al. 1997
12. Klipple and Costello 1960
13. Woolfolk 1949
14. Launchbaugh 1957
15. See review by Lacey and Van Pollen 1981

These papers are posted with John Willoughby.

- D. Dr. Laycock makes the statement that periodic heavy grazing will in most situations give faster recovery than reducing grazing pressure. I believe several papers by leading researchers contradict him on this point. They include:

1. Pieper and Heitschmidt 1988
2. Hart et al. 1993
3. Taylor et al. 1997
4. Review paper by Van Pollen and Lacey 1979
5. Review paper by Lacey and Van Pollen 1981

In the humid range types and in riparian areas, heavy grazing that is carefully timed has sometimes been effective in promoting range recovery. There are cases where carefully timed heavy grazing by sheep and goats has been effective in reducing unwanted plants. However these strategies usually adversely impact livestock performance and leave little residue to protect soil and provide food and cover for wildlife.

E. Dr. Laycocks statement that areas where improvement is desired often are in a lower successional stable state and will not improve with a change in grazing intensity in any time frame meaningful to management is somewhat misleading. Surveys indicate about 38% of BLM lands west wide are in a mid seral condition and about 13% are in a early seral condition. Nearly all lands in a mid seral condition have some residual climax decreaser species. Several studies have shown meaningful improvement of these areas over 20-50 year periods under reduced grazing pressure or no grazing. Some of these studies include:

1. Anderson and Holte 1981
2. McCormick and Galt 1993
3. Holechek et al. 1994
4. Potter and Krenetzby 1967
5. Yorks et al. 1992
6. Yorks et al. 1994
7. Smith and Schmutz 1975
8. Cooper 1953

I believe Dr. Laycock's (1991) "stable state" paper is most applicable to arid areas in a early seral condition but is less relevant to mid seral areas. What constitutes meaningful improvement is largely a social judgement. Demand and value of red meat, recreation, water and other products drive whether active (brush control) or passive range management practices are appropriate at any time.

F. Dr. Laycock strongly opposes the stubble height and residue standards in the draft EIS. In my opinion this is a social choice that depends on the objectives of the RAC. There can be no question that residue plays a vital role in sustaining esthetic appearance, soil stability, watershed quality, wildlife habitat, and fish habitat. Further it lowers rancher risk and plays a key role in livestock nutritional status. On the other hand maintaining minimum residues every year on areas grazed by livestock will be difficult due to drought. I suggest a compromise be reached with the goal to maintain minimum residues 7 years out of 10. I also suggest that a rancher be allowed to have up to 3 out of 10 key areas below residue minimums in any year. The key here is to avoid exceeding minimums in year after year on the same key areas. If standards are to be used in public rangeland management I hold the opinion that residue makes more sense than any other measurement. The best way to avoid or reduce downward trends and promote upward trends on arid and semi-arid rangelands is to maintain adequate residue. Minimum residues protect soil, watershed, wildlife, fish and esthetic values. This statement is based on a massive amount of research.

- G. A practical problem with short term heavy stocking in the proper season as suggested by Dr. Laycock is that it often does not accommodate rancher seasonal or annual forage needs. Another problem is heavy grazing almost always reduces livestock performance.
- H. I consider the coverage of the utilization issue by recent "Rangelands" articles suggested by Dr. Laycock somewhat one sided. I agree with the articles that percent utilization has low value in yearly management decisions (see Jasmer and Holechek 1984). However stubble heights and residues have proven to be a very practical management tool and can be easily measured. Jasmer and Holechek (1984) reviewed this issue in detail (paper enclosed). Dr. Laycock fails to consider that several leading range scientists through the years have advocated residue and stubble heights as a basis for management.
- I. Dr. Laycock states that I have a very different view of utilization than the majority of the range science community. I believe he should describe how my view differs from the majority of the range science community using papers that I and the others have published. I believe my papers show that I favor stubble heights and residue to monitor of grazing intensity but recommend that utilization coefficients be used to assign harvest efficiency to livestock. These ideas come from the long term stocking rate studies by Johnson 1953, Klipple and Costello 1960, Hooper and Hooper 1970, Bement 1968, Paulsen and Ares 1961, etc. My ideas are being tested on public rangelands in New Mexico. I would be most pleased to provide documents that support this statement.
- J. Dr. Laycock makes the judgement "This EIS document should not have any utilization figures or tables in it." He states "Such limits should be set only at the AMP level only as a "tool" to achieve a stated objective, and never as a land management objective." Dr. Laycock should clearly explain why he is so right on this issue and the RAC's are so wrong.
- K. It may be that the real issue between Dr. Laycock and myself centers around prescription versus information based range management. The residue approach to range management involves more knowledge, effort, and skill than prescription range management that centers around set grazing periods and set animal numbers with little emphasis on values other than desired plant composition. Prescription range management provides certainty to ranchers, it does not require the effort of annual residue checks by ranchers and range managers, and there can be no real assessment of management effectiveness until 5-10 years have passed and trend can be assessed. In the past the prescription approach relied heavily on active vegetation manipulation (i.e., Vale Project) funded by the federal government. More recently reductions in livestock numbers have been widely used. Under information based range management ranchers need to be given wide flexibility in management options and government serves more as a source of information rather than as a source of funds for range

improvements. Information from society on what it wants from federal rangelands plays a part in rancher management approaches and goals. The role of public rangeland managers is more as educators, mediators, and facilitors and less as regulators and prescribers. Under the information approach ranchers are not tied to set stocking rate or permit numbers. The rancher's annual report card might center around what percentage of the key areas were in compliance with residue or stubble height minimums while his longer term grade would place more emphasis on plant composition objectives. Low grazing fees, hunting permits, recreational fees, and biodiversity trust fund fees are some ways ranchers might be rewarded for doing well on their report cards. In order for information based range management to be effective ranchers need appropriate incentives, considerable flexibility, and better access to sound information (see Holechek and Hess, 1996, Forum for Appliers and Public Policy, p. 5-15). I believe it will require much change in attitude and training by professional range managers. I feel fortunate I have been given some opportunities to test the information approach in New Mexico. Without change away from the old ways, I believe the future of public land livestock grazing could be in great jeopardy.

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August 18, 1997

Dr. W. A. Laycock
Department Rangeland Ecology and Management
University of Wyoming
Laramie, WY 82071

Dear Bill:

I have enclosed my reviews of "Rangeland Health Standards and Guidelines for California and Northwestern Nevada Draft EIS" and your comments on the document. These reviews were requested by John Willoughby. You will note I take exception to some of your statements. I am particularly interested in why you are so opposed to residues and stubble heights as guidelines or objectives and how you believe I have misused the research data to prepare the table on utilization guidelines. My approach of relating percent use to heavy, moderate, and light grazing came from Gray (1968). He considered terms like heavy, moderate, and light grazing to be somewhat ambiguous unless related to level of utilization. You will note (see enclosure) he generalizes moderate grazing to be 30-50% use. Keep in mind my position has consistently been that grazing intensity should be monitored with stubble heights or residue (see Jasmer and Holechek 1984) and that utilization data are best used as harvest efficiency coefficients in grazing capacity determinations (Holechek 1988). While percent use is not well related to grazing severity in particular years, when it is averaged over 5-10 years it is fairly well related to rangeland trend and health (see Johnson 1953, Klipple and Costello 1960, etc.)

You will note I disagree with you on certain statements regarding grazing intensity outcomes. I have filed the studies that are the basis for my views on these issues with John Willoughby, and assume you already have them. These studies are cited in the documents I've enclosed. If you need any of them I'll be glad to send them to you. I have long considered the Johnson (1953) study to be an outstanding classic.

Dr. W. A. Laycock
August 18, 1997
Page 2

Residue has become an important concern on public rangelands here in New Mexico. Grazing intensity standards are now being applied on some Forest Service lands. While I've never advocated standards of any kind or that stocking rates be regulated on public lands, this is becoming more and more a part of grazing policy. At the invitation of both public range managers and ranchers, Dr. Dee Galt and myself (we are partners) are under contract to apply my approaches in grazing surveys on public and private rangelands in New Mexico. We are working closely with Dr. Chris Allison of the Range Improvement Task Force and Brian Sandford of the New Mexico State Department of Agriculture in these cases. We have had favorable responses to our surveys so far but more testing is needed. I would be pleased to provide you with our reports if you are interested in them.

I have enclosed an article by Heitschmidt and Walker (1996) that you may not have. They suggest on page 208 that standing biomass is much more important to the public than plant composition. They also advocate moderate stocking rates but they are vague about what specifically moderate stocking involves. Another article I've enclosed by Brown (1991) gives an environmentalist/hunter perspective on the residue issue.

Rather than resist residue approaches, I have tried to develop some reasonable compromises here in New Mexico. We are trying to get the Forest Service to go along with standards that provide ranchers some flexibility such as allowing them to exceed minimum residues 3 years out of 10. We are also trying to get them to permit up to 30% of the key areas to exceed minimum residue/stubble height guidelines during any year. We are presently testing both my stocking rate and stubble height techniques on the 550 AU Sacramento Allotment on Forest Service lands near Cloudcroft, NM. The ideas I have advanced on flexibility are also being considered. At this point in time we have had strong support from the ranchers, county planners, Range Improvement Task Force and NMDA. We believe application of sound range science can create win-win situations and avoid another fiasco such as the "Diamond Bar." A major part of this initiative is to train ranchers and Forest Service range managers on how to use the stubble height/residue approaches. One of our objectives is to move away from the prescription permit numbers approach and encourage ranchers to manage their rangelands around residue. So far I am most encouraged by our experiences on the Sacramento and the Copper Creek Allotments. However it is too early to declare our approach a model other areas can use.

Dr. W. A. Laycock
August 18, 1997
Page 3

I will be interested in learning more about your ideas on this subject and consider this a great opportunity to improve my own range science skills and knowledge. I allow that I don't have all the answers and there is room for improvement in my ideas and approaches. I would greatly value your review of the enclosed paper "Conducting Grazing Surveys: Some Experiences and Opinions" by Dr. Galt and myself. Thank You.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Holechek". The signature is fluid and cursive, with a large initial "J" and a long, sweeping underline.

Jerry L. Holechek
Professor, Range Science

Enclosure

cc: John Willoughby
Ed Hastey

Enclosures

BEN ZANDSTRA
1st District

JOE COLT
2nd District

PATRICIA CANTRALL
3rd District

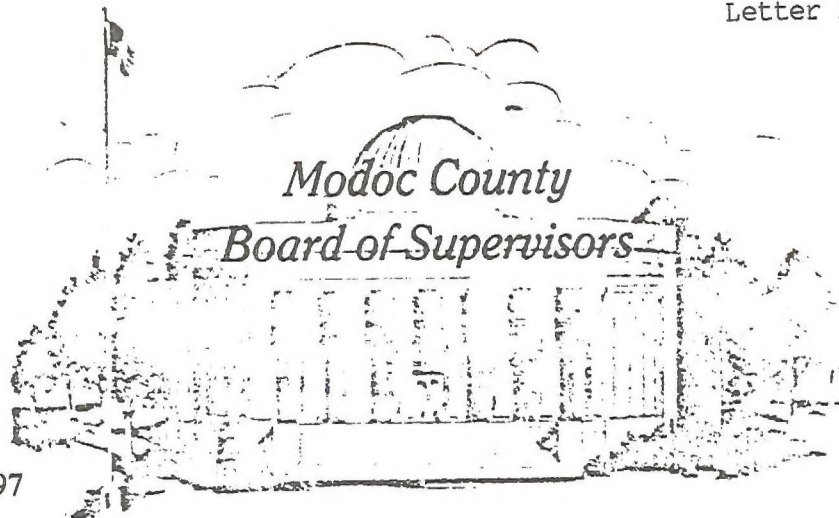
RON McINTYRE
4th District

NANCY J. HUFFMAN
5th District

MAXINE MADISON
County Clerk
and
Clerk of the
BOARD OF SUPERVISORS

Box 131
ALTURAS, CALIFORNIA 96101

(916) 233-6201



August 19, 1997

Bureau of Land Management
State of California
2135 Butano Drive
Sacramento, CA 95825

Attn: Rangeland DEIS

Dear Sir:

The Modoc County Board of Supervisors wishes to submit the following comments regarding the Rangeland Health Standards and Guidelines for California and Northwestern Nevada Draft EIS. The comments were prepared by the Modoc County Land Use Committee and were approved by the Board of Supervisors at its regularly scheduled meeting of August 19, 1997.

1. Modoc County supports Alternative 1, specifically the Susanville RAC recommended Standards and Guidelines with the exception of Guideline 14, Transitional Guidelines.
 - a. The County applauds the hard work of the Susanville RAC whose volunteers put in long hours to produce this alternative.
 - b. The opening sentence in the preamble is especially valid. "Health Rangelands contribute to the social and economic well being of rural communities in Northeastern California"...
 - c. Standard 4: Riparian and Wetland Sites - Exceptions and Exemptions to Standard 4 is especially singled out for support. Areas around watering and handling facilities have proved to be monitoring sore points in the past.
 - d. The County believes guideline 14 is unnecessary and could cause harm. Because it would require immediate action take place on an allotment that does not meet standards, many options to solve the problem would not be available. The time frame would not allow, for example, the construction of any kind of improvement to help bring the allotment into compliance because of the time necessary for

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NEPA analysis, construction etc. Therefore, the only remedies are those which reduce livestock numbers, season of use, etc., all which have adverse economic impacts on local communities. Guideline 14 should be removed so all the tools that could bring an allotment into full compliance remain available.

12.1-1
cont.

2. Modoc County opposes Alternative 2, the Statewide Standards. While not being too much different than the status quo, the local standards and guidelines of Alternative 1 are preferred.
3. Modoc County rejects Alternative 3, the National Fall Back Standard and Guidelines. Once again, this alternative is less desirable than Alternative 1, which was developed locally.
4. Modoc County strongly opposes Alternative 4. The implementation of this alternative would have significant negative economic impacts to Modoc County without a corresponding improvement in rangeland health. The livestock numbers would go down, but the BLM lacks the resources to immediately manage these problems. Rangeland problems can be corrected under Alternative 1 with less impact on livestock operators, local communities and the agency.

5. Economics

12.1-2

- a. It is unclear whether the multiplier was applied to the dollar impacts displayed.
- b. It is unclear whether a separate job multiplier was used when assessing job impacts.

12.1-3

- c. Modoc County appreciates the fact that early scoping identified that the County could be severely impacted and therefore was included with Lassen and Washoe as a principle grazing county to be more closely analyzed. However, failure to display the data because it wasn't available from the local resource area is not acceptable. Even if the discussions have shown the impact is minimal, display the data to show that information.
- d. While permittees living outside the County have some impact on how the AUM's or loss of AUM's are analyzed, Modoc County is unique in that regard. As a significant number of Washoe County AUM's are grazed by livestock owned by operators in Modoc County (Surprise Valley), a display/analysis of this unique situation would be helpful.

Page 3

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- e. Overall, this is the best economic analysis done by a federal agency since Modoc County has begun reviewing projects.

6. Miscellaneous

- 12.1-4 a. The County is concerned about implementation of the selected alternative. The level of impact will be dictated by whether the final decision is implemented all at once or on a priority basis. Modoc County encourages that it be done on a priority basis as resources are available. While references are made throughout the text that implementation will be prioritized, it appears language such as Guideline 14 in the Susanville RAC Standards and Guidelines would override implementation by priority. The County would again recommend removal of that guidelines.
- 12.1-5 b. It is unclear if allotments that fail to meet standards and guidelines for reasons not directly associated with livestock (i.e., juniper encroachment) could still be exposed to possible livestock reduction.

Thank you allowing Modoc County to respond.

Sincerely,



BEN ZANDSTRA
Chairman

BZ:cm

MAXINE MADISON
County Clerk
and
Clerk of the
BOARD OF SUPERVISORS

Box 131
ALTURAS, CALIFORNIA 96101

(916) 233-6201

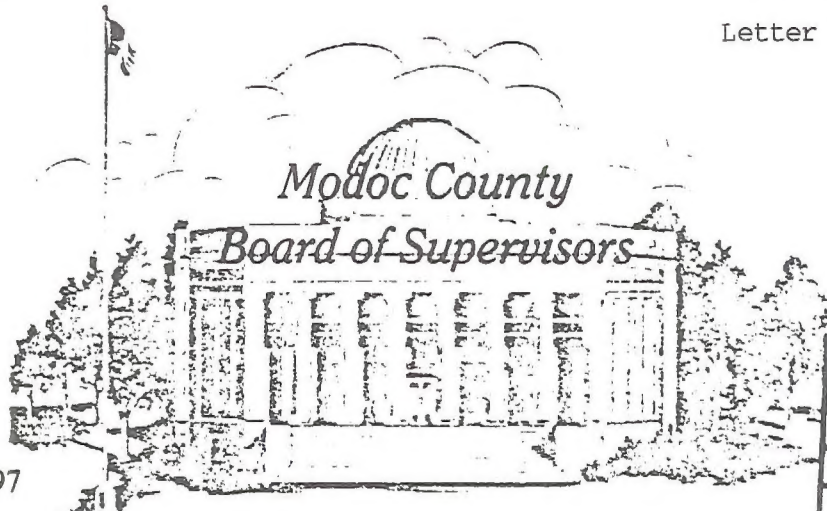
BEN ZANDSTRA
1st District

JOE COLT
2nd District

ATRICIA CANTRALL
3rd District

RON McINTYRE
4th District

NANCY J. HUFFMAN
5th District



August 19, 1997

Mr. Ed Hastey, State Director
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95835

To	Initial	Date
SD		
ASD		
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Supt Svcs		
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Attn: Rangeland DEIS

Dear Mr. Hastey:

By direction of the Modoc County Board of Supervisors, I am responding to the Rangeland Health Standards and Guidelines for California and Northwest Nevada Draft EIS.

We favor Alternative 1 as described in the DEIS.

12.2-1

As you know, the BLM created three Resource Advisory Councils for the areas in your jurisdiction. These councils included members of the interested public, including members representing elected officials. The elected officials: Bill Maze, Tulare County, Nancy Huffman, Modoc County and Denny Bungarz, Glenn County, have recommended Alternative 1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law, the BLM and has the least negative effect to the cattle industry and the Counties.

Alternative 1 was developed by a group of citizens with varied backgrounds and interest after considerable training on basic ecological processes.

12.2-2

The Modoc County Board believes Guideline 14, included in Alternative 1, is unnecessary and could cause harm. Because it would require immediate action take place on an allotment that does not meet standards, many options to solve the problem would not be available. The time frame would not allow, for example, the construction of any kind of improvement to help bring

Mr. Ed Hastey
Page 2
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12.2-2
cont.

the allotment into compliance because of the time necessary for NEPA analysis, construction, etc. Therefore, the only remedies are those which reduce livestock numbers, season of use, etc., all which have adverse economic impacts on local communities. Guideline 14 should be removed so all the tools that could bring an allotment into full compliance remain available.

Your favorable consideration of our recommendation is appreciated.

Sincerely,

A handwritten signature in cursive script that reads "Ben Zandstra". The signature is written in dark ink and is positioned below the word "Sincerely,".

BEN ZANDSTRA, Chairman
Modoc County Board of Supervisors

BZ:cm

CRAIG DREMANN , individually and d.b.a.
THE REVEG EDGE, Box 609
Redwood City, California 94064
Phone (415) 325-7333 FAX (415) 325-4056

COMMENTS ON "UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT'S RANGELAND HEALTH STANDARDS AND GUIDELINES FOR CALIFORNIA AND NORTHWESTERN NEVADA and DRAFT EIS" (hereinafter "EIS") , dated May, 1997.

1.) I am a citizen of the United States of America and a permanent resident of San Mateo County, California, and over the age of eighteen, and these comments are made on the basis of my personal knowledge of the facts, and if sworn as a witness would be competent to testify to the facts stated.

2.) I have an economic interest in the United States Department of Interior Bureau of Land Management (hereinafter "BLM") and their management of our public perennial native grass natural resources , as my business involves the ecological restoration of wildlands utilizing local genetic material, and my business depends on preservation and availability of in situ native perennial grassland seed resources.

3.) I am a "party" as defined by 5 USC § 551 (3), properly seeking and entitled as of right to be admitted as a party, in an agency proceeding, to comment on this EIS.

MAJOR LEGAL INADEQUACIES OF THE EIS

- 13-1
- 4.) EIS is inadequate as it violates NEPA 42 USC § 4321-4347.
 - 5.) EIS is inadequate as it violates Public Rangeland Improvement Act 43 USC § 1701-1782.
 - 6.) EIS is inadequate as it violates the Sherman Antitrust Act 15 USC § 1 et seq. , as it grants and maintains a monopoly.

COMMENTS AND INTRODUCTION

7.) There is a severe crisis in the protection and preservation of the entire perennial native grass biome of California and northwest Nevada.

8.) The accidental or intentional extermination of over 90% of the original perennial native grass cover of these two states have created a paradox; the more grassland we destroy, the more we limit our ability to have seed available to harvest from the remaining wild stands for use on large scale restoration or mitigation projects of the severely degraded grassland areas.

9.) There has been widespread extermination of whole populations of the native perennial grass biome, which permanently depletes the genetic structure of the public lands, perhaps making mitigation or restoration of the destroyed areas of the public resource impossible.

10.) Currently, these does not even exist the scientific process in place to conduct large scale mitigation of the California or northwest Nevada grassland biome.

11.) Grazing poses a particularly widespread threat to California's perennial native grass communities, as evidenced by the severe decline in those communities by grazing of livestock.

12.) The native perennial grassland communities are legally (as defined by the Federal Endangered Species Act) "threatened" statewide by grazing, in that the populations will continue to be exterminated by grazing as long as grazing is conducted in California and northwest Nevada.

13.) The native perennial grassland communities reproduction and community diversity, genetics and structure are depauperate under grazing; and once depauperate, the removal of grazing does not repair the damage, because viable seed in the soil bank no longer exists, and exotics have taken up permanent residence.

14.) California's perennial native grasslands contain species of plants and animals unique to California, and BLM's land contains the most genetic diversity within each species of any area in the United States, due to the environmental extremes found in the state; the scale of genetic diversity that occurs in California is only approached by one other state, Hawaii.

13-2

15.) The EIS does not discuss the uniqueness and extreme genetic diversity that occurs on BLM's land, and it has never been mapped or measured by BLM; even though the United States Forest Service (hereinafter "USFS") has done so regarding the tree species it manages on USFS public land.

16.) Massive extinction has already occurred of the genetic diversity of the California perennial grassland biome, and BLM does not address what has been lost so far through grazing, and how that destruction will be halted or reversed; *diversity must be measured, mapped and monitored in order to manage it.*

13-3

17.) BLM cannot legally under NEPA justify any continuation of grazing of its public native perennial grassland resources until it has a scientific monitoring method that allows annual health and trend assessments of each grazing allotment.

18.) Current monitoring methods take a minimum of 15 years to complete one monitoring pass within any resource area, and the method is skewed to also count relatively inedible shrubs as a percentage of native forage, even when the grass component/understory has become extinct from overgrazing.

19.) In areas where BLM management has allowed the native perennial grassland component to become completely extinguished, range health conditions are not even conducted, because measurement would show extinction of the entire native biome (i.e. Sacramento valley, San Joaquin valley, and most of what has been allowed to become the deserts of southern California).

13-3
cont.

20.) Without the ability to even monitor grazing allotments, except on a 10-15 year rotation, there is no ability to manage the native perennial grassland public resources.

13-4

21.) There is no scientific and physical ability to indicate "trends" in the resource; nor any ability to penalize the licensee for damage; no mitigation or damage assessments are proposed.

13-5

22.) The analogy of BLM's past and proposed future "management" of the public perennial grassland resources is like a supermarket which opens its door, and allows the shoppers to fill their shopping carts full with whatever they wish, and they are only charged by the cart-full (i.e. AUMs); and those carts are never checked, and the shelves are never inventoried, and the shoppers are carting away the infrastructure of the store, along with the equally priced resources; and BLM has no idea of the actual cost of restocking the shelves (i.e. mitigation).

13-6

23.) To add insult to injury to the poor California and northwestern Nevada perennial native grasslands, BLM is suggesting maintaining a monopoly use of the public resource with no talk about other uses, i.e. commercial seed harvesting, hay harvesting, etc.

13-7

24.) The title "rangeland" is indicative of all the violations and inadequacies that this draft EIS is heir to; that BLM is not attempting to write an EIS or manage a "natural resource," but rather providing a monopoly for a single use by a small minority of the public.

25.) The accurate definition of the EIS should be "Native perennial Grassland Biome and Riparian Standards and Guidelines;" for these are the natural resources at stake in the document, threatened by this document's inadequacies.

13-7
cont.

26.) BLM's EIS is a fait accompli, in that a tiny minority of the state has complete use of millions of acres of two states without any legal basis; we would expect this in a third world dictatorship, but not in a democracy.

27.) How can BLM write a document that allows the concentrated single-use by only 705 people?; the courts frown on monopolies of any sort.

EIS INADEQUACIES

13-8

28.) The EIS is inadequate because the data on the perennial native grasslands is incomplete, twelve years old, and "does not collect certain critical information necessary to whether uplands are healthy or in proper functioning condition." (EIS chapter 3, page 35-6).

13-9

29.) The EIS is inadequate because the grazing of California's and northwestern Nevada's perennial native grasslands is a major federal action, significantly affecting the environment within the meaning of 42 USC § 4332, and grazing licenses monopolize millions of acres of public land for a single use.

13-10

30.) The EIS is inadequate because there is no assessment in this document of what the current remaining cover is for each resource area, and there is no adequate method of measuring the remaining resource.

31.) The EIS is inadequate because it is based on data for the perennial native grasslands that is incomplete, that "slightly less than 1.3 million acres of the 4.4 million acres under grazing..." of the grassland biome's health has been inventoried in detail (Chapter 3, page 35).

32.) The EIS is inadequate because continued grazing without a benchmark measurement as of a particular date, you will have no ability to "manage" a resource, in that you do not have a current and continually monitored inventory or measurement of the resource you are managing.

13-10
cont.

33.) The EIS is inadequate because there is no method to measure the "infrastructure" that is being carted away along with the grassland resource; the (hereinafter) "infrastructure" is defined as biodiversity, genetics, soil, nutrients, biomass, mulch, stream and water quality characteristics and all of the other items which allows the living resource to thrive in a particular area.

13-11

34.) The EIS is inadequate because there is an erroneous inverse payment schedule for resources currently by BLM; areas that can possibly handle grazing and recover quicker because they are in a higher rainfall area, are valued higher per acre because you can run more head of grazing animals; sensitive areas that are easily damaged like arid lands with < 20 inches annual precipitation, where restoration is fantastically expensive and takes decades of mitigation work, payment for that resource is as low as 30¢ per acre per year because you need 1.5 square miles per cow per year.

13-12

35.) The EIS is inadequate because grazing licenses are not structured to monitor or measure trends of the resource on an annual basis, including monitoring the "infrastructure;" and the cost of mitigation of damage is not factored in.

36.) The EIS is inadequate because there is no mitigation bond required for mitigation of damage; "damage" needs to have a pre-defined per acre cost calculated; the current cost for each foot of stream cutting, the current cost for riparian restoration including labor and using local genetic material, and for any decrease in the acreage or density of the native grass stand, a current cost per acre of restoring the stand to the previous year's level including labor and materials.

37.) The EIS is inadequate because it maintains the current levels of native perennial grassland "mining," an extractive method of "managing" the resource where you are allowing decline and eventual extinction of the resource.

13-13

38.) The EIS is inadequate because it does not advocate suggest ways to do "sustainable" management, which means that you are managing the resource so that it at least is checked in place, at a particular date; and preferably, the resource once it is stabilized at a particular level, you achieve incremental improvements resource-area-wide each year to bring the resource up to as near a level that existed prior to the damage that you allowed from grazing.

13-14

39.) The EIS is inadequate because BLM cannot answer the question, "is the resource that BLM is managing diminishing, increasing, or staying the same?"; if you cannot scientifically answer that question, then as land managers, BLM cannot legally, morally, or ethically put *any* impacts on that resource until they can answer that question.

13-15

40.) The EIS is inadequate because it fails to discuss the overall potential alternative public use of perennial native grasslands, and uses other than monopoly grazing licenses.

13-16

41.) The EIS is inadequate because BLM's grazing licenses are de facto articles of trade or commerce, in that they permit the private commercial exploitation of publicly owned perennial native grassland biome resources including fresh water supplies by a monopoly, single use group.

42.) The EIS is inadequate because these licenses are considered by licensees to be appurtenant to their own privately-owned ranches, and that these licenses are usually transferred along with their real private property as an appurtenance.

13-16
cont.

43.) The EIS is inadequate because these licenses have been held as a monopoly the perennial native grassland biome resources, by a very tiny minority (less than 800 individuals in a state of over 35 million), single use group, for their own exclusive use, at below market rates, in violation of 15 USC § 2, and in violation of 37 USC 1901 (a) (4), the multiple-use value directive of Congress towards the perennial grassland biome.

13-17

44.) The EIS is inadequate because the Sherman Antitrust Act does not allow BLM to conspire to maintain a monopoly, to grant an exclusive use of a public resource for private economic exploitation; and it is plain in the document that it is BLM's intent and purpose to exercise its power to maintain such a monopoly, to continue to allow a small number of individuals to have control over such a vast portion of a public resource.

13-18

45.) The EIS is inadequate because has effectively excluded both other public utilization of the resource as well as other private economic use of the resource, coupled with policies and formulations of documents like the EIS, designed to preserve that power and monopoly.

13-19

46.) The EIS is inadequate because BLM is granting a privilege or peculiar advantage rested in a small number of individuals, consisting in the exclusive right to utilize the public's native perennial native grasslands for private economic purposes, and with BLM's policies to preserve and protect that exclusive use, only a few families dominate the total public natural resource of California's and northwestern Nevada's perennial native grass resources.

47.) The EIS is inadequate because BLM does not have a policy to freely and competitively price the native perennial grassland resource, or have a system of freely distributing the licenses to that resource on the open market.

13-19
cont.

48.) The EIS is inadequate because BLM's perennial native grassland resources are transferred whole, pre-selected, for private economic use, in its entirety, in perpetuity; with no ability for the general public to break that monopoly.

49.) The EIS is inadequate because it does not give any maps or indication of the overall plan for grazing allotment locations, thus making it impossible for the public to determine where and when grazing will occur and to what intensity and to assess damage or health; and to independently confirm BLMs assertions.

13-20

50.) The EIS is inadequate when it does not give data on each allotment, its acreage, location, recent (past five years) utilization data, current condition; because public needs actual data to be able to inspect individual allotments and confirm BLM's assessment, or confirm that BLM actually has no data upon which to be able to determine trends in health, especially on upland native perennial grassland sites (Chapter 3, pages 33-38).

51.) The EIS is inadequate because details of each of the current monopoly licenses are unknown; the public to make an informed decision needs to have an appendix to know the details of each of the 705 grazing licenses: who holds them, their addresses, acreage, location of allotment, name of allotment, when first established, license renewal cycle and date of next renewal, number of head run, type of livestock, number of violations, types of violations, mitigation of any, penalties, cost of license, current health condition of allotment, needed improvements or needed mitigation to bring allotment to a self-sustaining and not declining state of health, cost of that mitigation, and will the licensee be charged for that mitigation?

52.) The EIS is inadequate because it appears to a reasonable person that BLM is hiding the details of the grazing licenses to the greatest extent possible, so the public cannot examine each of these licenses more closely.

13-20
cont.

53.) The EIS is inadequate because it does not give enough information to aid in a substantive decision of what the environmental consequences are from the "project" of granting monopoly licenses for grazing; and the public does not have adequate information to be able to participate in the process.

13-21

54.) The EIS is inadequate because characters used to determine "health" only measure the resource within the narrow perspective of use for domesticated animal grazing, and does not measure the resource as a functioning ecosystem; with a requirement to maintain genetic integrity, species diversity, and low levels of exotic establishment, in order to be self-maintaining into the future,

13-22

55.) The EIS is inadequate where statements mention mitigation measures but do not explain the proposed mitigation measures in detail or explain how effective those measures would be.

13-23

56.) The EIS is inadequate since substantial questions exist concerning potential adverse effects of grazing perennial native grassland communities on the quality of the human environment, and BLM failed to account for factors necessary to determine whether significant impacts would occur.

13-24

57.) The EIS is inadequate because the severe environmental impacts in California and Nevada on those states' perennial native grassland communities is not discussed, and those damages are not remote or highly speculative consequences, but are very certain and well known.

13-25

58.) The EIS is inadequate because it must contain all feasible alternatives to the proposed monopoly grazing licenses for the utilization of the public's perennial native grassland resources for private economic use.

13-26

59.) The EIS is inadequate because there has not been a good faith attempt to identify and discuss the known environmental consequences of the monopoly grazing licenses.

60.) The EIS is inadequate because the known and potential magnitude of environmental damage by monopoly grazing licenses, and those known damages are sufficient to warrant complete rewriting of the draft environmental impact statement; so the public can have BLM consider specific solutions to problems in greater detail than the initial evaluation of the tentative, general, and too broad first approach.

13-27 61.) The EIS is inadequate because it is too general, vague, and contains conclusionary statements which are not backed up by scientific studies or facts; environmental assessment must offer more than "checklist" assurances and alternatives; and alternatives [other than use of resource by public through monopoly grazing licenses] must indicate that the agency has taken a searching, realistic look at the potential environmental degradation and mitigation, and, with reasoned thought and analysis, candidly and methodically addressed those concerns.

13-28 62.) The EIS is inadequate because of its failure to offer alternative use other than exclusive monopoly license of public's perennial grasslands; licenses to use these resources are tightly controlled by the monopoly and other potential licensees are shut out of the process [i.e. a conservation organization offering to pay the same license fee, or more, for a particular grazing allotment, to utilize the grassland for wildlife use, is barred from participation; or a commercial seed company paying the same license fee for a grazing allotment to harvest the native grass seed crop; or that all licenses for the public's resources are not available to the general public on the same free-market basis].

13-29 63.) The EIS is inadequate because BLM has no ability under the EIS to protect the resources mentioned in the EIS.

13-30 64.) The EIS is inadequate because there is no discussion about cumulative impacts of monopoly grazing licenses.

- 13-31 65.) The EIS is inadequate because there are no provisions to police licensees, and no penalties for damage to the resources.
- 13-32 66.) The EIS is inadequate because it does not discuss the Clean Water Act and the cumulative impact of non-point source water pollution caused by erosion due to grazing and nutrient flows into waterways from domesticated animal manure.
- 67.) The EIS is inadequate because data on the perennial native grassland health is completely lacking.
- 68.) The EIS is inadequate because there is no effort to analyze, interpret or evaluate the data BLM does possess on their collected monitoring data, to determine trends (Chapter 3, page 16) in perennial native grassland health.
- 13-33 69.) The EIS is inadequate because there is no ability by BLM to implement their proposed mitigation measures; i.e., if a range is overgrazed, there is no penalty, enforcement measures, mitigation requirements to be completed by the licensee, nor any ability to protect the resource that BLM is charged to protect.
- 13-34 70.) The EIS is inadequate because there is no outline on how BLM suggests that they can complete the assessment of the perennial native grassland health; without those assessments, the EIS is inadequate.
- 13-35 71.) The EIS is inadequate because it suggests that the native indigenous species may be "incapable of maintaining or achieving properly functioning conditions and biological health;" biological health and function of a natural system does not include the introduction of exotic species, and indeed in every case, exotic species interfere with natural system function (Chapter 2, page 10, guideline 8).
- 13-36 72.) The EIS is inadequate because there is no plan or outline on how BLM suggests that they can take "appropriate corrective action immediately upon the

13-36
cont.

standards and guidelines taking effect;" since BLM cannot currently assess the health of the public perennial grassland biome; and that BLM is currently unable or unwilling to take appropriate corrective action, there is no evidence presented that any new standards and guidelines taking effect will improve BLM's ability to assess health or take appropriate corrective action on their 4.4 million acres.

13-37

73.) The EIS is inadequate, and the EIS was intentionally written knowing that it was inadequate and that the data is incomplete; because a complete assessment of the total impacts on the resource and the negative health trends caused by the 705 monopoly grazing licenses on the 4.4 million BLM acres could cause that particular use of the public resources to be severely curtailed, excluded or banned in the future, as a prohibited monopoly and too damaging to the resource.

13-38

74.) The public is entitled to relief, prohibiting California BLM from granting *any* grazing licenses, and prohibiting BLM from maintaining a monopoly regarding a public resource; *pending the completion of an adequate EIS and establishing a program to make licenses available to the entire public on a free-market basis.*

Respectfully submitted,

Date: Aug. 21, 1997

Craig C. Dremann
(signature)

CRAIG C. DREMANN
type or print name

Mattole Landowners for Sensible Watershed Management
P.O. Box 214 Petrolia CA 95558

Bureau of Land Management
California State Office
2135 Butana Drive
Sacramento, CA 95825
Attn.: Rangeland DEIS

Re: Standards for Healthy Rangelands, etc.

We find your draft of "Standards and Guidelines for Rangeland Health in California and NW Nevada" practical and pertinent. We approve that public lands maintain multipurpose land usage. It is understood that some habitats are more sensitive to livestock grazing than others. Our main concern is that individual areas are considered on a site by site basis.

Our "Sensible Watershed" group consists of over 1000 property owners, large and small, owning over 70% of the land in the Mattole Watershed, which is adjacent to the Kings Range Conservation Area in Humboldt Co.

14-1 Some of our members do lease a portion of the Kings Range. We are concerned that this area retains the grazing leases for at least 6 months of the year, preferably for 8 to 9 months. It is an economic necessity to these small family owned ranches. Raising cattle here in the valley is marginal. With out these leases these ranchers would be forced to sell their property or sub divide it so that more people would populate the valley and further degrade the land and Mattole River salmonoid runs. Having read over the DEIS draft we see no reason to abolish these leases. The livestock grazing is beneficial to these nutritional pasture lands. Grazing helps prevent fires caused by hikers and hunters carelessness. The cattle do not compete with any flora or fauna. Wildlife is thriving on the Kings Range. Mountain lion and bear are plentiful In fact, a fisher was sighted a couple of months ago. They were considered extinct in this portion of the Mattole from over hunting in the 1920's. We feel that the mouth of the river and estuary should be more protected from any errant cattle and will encourage the person that leases nearby pasture to keep fences mended.

14-2

Again, we commend the thoughtfulness and science of your draft of Guidelines and Standards. The Ukiah plan seems most suitable to our area.

Sincerely,

Lorene Etter, secretary MLSWM

cc : Linda Roush, Arcata Resource Area
Dan Weaver, Petrolia

Rangeland Health Coordinator
Bureau of Land Management
2135 Butano Drive
Sacramento, CA 95825

August 15, 1997

Dear RHC:

I began visiting the area within the Susanville District (SD) of the Bureau of Land Management in 1969. Since then I have seen a good portion of the district. I'm concerned about the management of the public lands (I guess I'm a part owner), therefore I would like to provide comments on the Rangeland Health Standards and Guidelines for California and Northwestern Nevada Draft EIS.

- 15-1 [After reading 1.2 Purpose and Need I saw no mention of any economic considerations. It is based on a healthy environment for the benefit of all users of the public lands. Since this document is for the public benefit the economic analysis should include an analysis of benefits for all of the public, not just economic analysis of the benefits to the livestock industry.
- 15-2 [1.8 states The viability of native plant and animal communities must be addressed in the standards and guidelines. It is not adequately addressed. The only standard that mentions wildlife in the SD is 5. Biodiversity. states Healthy, productive and diverse populations of native plant and animal species, including special status species are maintained. Now I wonder if the California Department of Fish and Game (DFG) or US Fish and Wildlife Service (USFW) would characterize the native plant and animal species within the SD as healthy, productive and diverse? Has the BLM asked the DFG? Sage grouse populations are down, deer populations are lower than they have ever been, Lahontan cutthroat trout are extinct (originally present in Smoke Creek), mountain quail are almost gone (small remnant populations on several of the desert mountain ranges in Lassen County) and willow flycatchers in very low numbers in a small portion of their historic range.
- 15-3 [Alternative 4 represents the best alternative for the general public's interests. Rapid recovery will benefit all users of the public lands including livestock producers in the long run.
- 15-4 [Surface and groundwater quality in all California BLM Districts should comply with all California, Tribal and Federal water quality standards. Apparently the Susanville RAC feels that their interests are best served by polluted water. Most users if polled would disagree.
- 15-5 [Guideline 1 SD. Stubble height requirements are necessary on all habitats within the Susanville District, not just within the stream-side areas. Ground nesting birds have been eliminated or

15-5
cont. greatly reduced by the grazing levels of the past 100 years. Mountain quail for example have been totally eliminated from many of the desert mountain ranges in Modoc, Lassen and Washoe Counties. They are impacted by lack of stubble and excessive browsing of brush has also eliminated much chokecherry, ceanothus, serviceberry, mahogany, quaking aspen and bitterbrush.

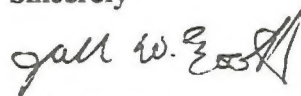
15-6 Guideline 8 SD. Who will determine if grazing use by livestock is providing for habitat requirements of fish and wildlife? If it is the same body that has led to the current situation I do not feel comfortable. I suggest this should be determined by the DFG or USFW..

15-7 Guideline 14 SD. 50% utilization of browse species is to much. The brush species will continue to decline under this grazing pressure.

15-8 Appendix 12 left out Special Status Animal Species that no longer occur on BLM lands within the project area (Lahontan cutthroat trout). Are there others? This is not appropriate, I would hope that the Appendix be reviewed for similar omissions and corrected or at least state that extirpated species are left out and there is no intent to manage habitats for extirpated species.

15-9 Rangeland health and livestock grazing are not mutually exclusive. Rangeland health and healthy, productive and diverse wildlife populations are not mutually exclusive. Livestock grazing and healthy, productive and diverse wildlife populations are not mutually exclusive. What is mutually exclusive is the past and present level of grazing, time of use, and lack of management and healthy, productive and diverse wildlife populations. Healthy, productive and diverse wildlife populations are an economic asset to the local , state and national economy. Now go do your job correctly and develop Standards and Guidelines that will protect the public interest.

Sincerely



Jack Booth

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Ukiah, CA 95482



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BUR OF LAND MGMT

*Natural Resources
Defense Council*

AUG 28 3 35 PM '97

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CALIF STATE OFFICE
SACRAMENTO, CALIF

August 27, 1997

Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, California 95825
Attention: Rangeland DEIS

Dear Bureau of Land Management:

Attached please find the comments of the California Native Plant Society (CNPS) and the Natural Resources Defense Council (NRDC) regarding your draft Environmental Impact Statement (DEIS) on Rangeland Health Standards and Guidelines (S&Gs). As we state in our comments, CNPS and NRDC appreciate the tremendous effort that went into the preparation of the DEIS by Bureau employees, Resource Advisory Council members and others who care about the public's rangelands. Nonetheless, our analysis of the document reveals little basis for hope that the S&Gs considered will achieve the overarching goal of Rangeland Reform '94 - substantial and rapid improvement in the health of grazed ecosystems. Because we and the members of our respective organizations believe strongly in this goal, we provide in our comments detailed and comprehensive suggestions for accomplishing it. We hope that the Bureau of Land Management will seriously consider these suggestions, and take full advantage of the opportunities to improve not only range health, but also public trust and confidence in your management of the public's lands.

We are available to provide additional information, if needed, or to answer any questions. Please feel free to contact us at any time.

Sincerely,

Emily B. Roberson, Ph.D.
Senior Land Management Analyst
California Native Plant Society

Johanna H. Wald
Senior Attorney
Natural Resources Defense Council

COMMENTS
of the
CALIFORNIA NATIVE PLANT SOCIETY
and the
NATURAL RESOURCES DEFENSE COUNCIL
on the
**DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR RANGELAND HEALTH STANDARDS
AND GUIDELINES FOR CALIFORNIA
AND NORTHWESTERN NEVADA**

Prepared by:

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August 27, 1997

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The California Native Plant Society (CNPS) and the Natural Resources Defense Council (NRDC) are pleased to comment on the Draft Environmental Impact Statement for Rangeland Health Standards and Guidelines for California and Northwestern Nevada (DEIS). Domestic livestock grazing has been an issue for the Society and for NRDC for over two decades. CNPS members and staff have worked with the Bureau of Land Management (BLM) on grazing issues for many years, including participating on Resource Advisory Councils (RACs) during the preparation of this DEIS. NRDC staff and members have participated in numerous land use and allotment planning efforts as well as in the development and revision of numerous agency policies and rules, including Range Reform '94, pursuant to which this DEIS is being prepared. NRDC and CNPS members use BLM lands extensively for research, education, and recreation.

Both CNPS and NRDC agree that properly managed grazing may benefit certain ecosystems, plant communities or species by mimicking or partially mimicking natural disturbance regimes. However, as customarily practiced on public lands in California, grazing has been a leading cause of loss of native communities and conversion to exotic weed fields. Grazing has also been noted repeatedly as the second greatest threat to federally and state listed threatened and endangered plants, following only development (Calif. Department of Fish and Game, 1984-1993). In addition, the adverse impacts of poorly managed grazing on riparian areas and on other wildlife habitats are well known (e.g. Fleishner, 1994; Ohmart, 1996).

We appreciate the tremendous effort that went into the preparation of this DEIS as well as the time and effort contributed by RAC members around the state. Rangeland Reform '94 and this DEIS represent significant achievements for the BLM and for public lands grazing management. CNPS and NRDC are committed to continuing to work with the BLM to fulfill the goals of Rangeland Reform '94 and to improve the health of grazed ecosystems in California.

Rangeland Reform '94 was initiated because the American public, the owners of BLM lands, want improved grazing management. They want clean water and healthy streams, wildlife and plant communities on publicly-owned lands (see, e.g., Brunson and Steel, 1994). Throughout the Range Reform process, the BLM repeatedly expressed its understanding of the public's desires and its intention to meet their expectations. Thus, for example, in its Advance Notice of Proposed Rulemaking, the agency acknowledged that there is a great need for improvement in management in order to "accelerate restoration and improvement of the public rangelands." (58 Fed. Reg. 43208 (August 13, 1993)). Subsequently, in promulgating the final rule, it acknowledged the need to change current management to prevent continued decline "in critical riparian areas," "help correct problems in grazing use and ... improve the degraded condition of some areas expeditiously." (60 Fed. Reg. 9907 (February 22, 1995)). Above all, the BLM stressed that the goal of Rangeland Reform was "improving the ecological health of the rangelands," (*id.*), as well as that "achieving and maintaining properly functioning ecosystems is critical to the protection of public rangelands...." (59 Fed. Reg. 14325 (March 25, 1994)).

Based on our review of this DEIS and the proposed standards and guidelines (S&Gs), however, we seriously doubt that either this document or the S&Gs will enable the BLM to fulfill the important commitments to the public made in Rangeland Reform '94. As discussed in detail below, this DEIS relies heavily on subjective information, is vaguely worded, and fails to analyze a range of management approaches. Similarly, as written, the S&Gs in this DEIS are vague, incorporate no timelines or triggers for action, contain an inadequate implementation plan, and include no monitoring plan. There is, in addition, no information about how, where or when the BLM intends to implement the fallback S&Gs which are now applicable to BLM-managed rangelands in California. All of these problems create the impression that completion of the DEIS process will bring little improvement in on-the-ground grazing management in either the short or long term. They also give the impression that finalization of the S&Gs is unlikely to substantively or expeditiously improve the health of BLM lands in California.

Summary of Recommendations

To remedy these and other problems related to the requirements of the National Environmental Policy Act (NEPA) and Rangeland Reform '94, our comments present numerous specific and detailed recommendations to the BLM. In summary, our major recommendations are that the BLM should:

1. Revise the proposed S&Gs to include specific, objective provisions and terms as promised by the Interior Department and BLM during the Rangeland Reform process.
2. Prepare a supplemental DEIS. Indeed, as discussed below, we believe a supplemental DEIS is required by NEPA.
3. Address real alternative approaches to grazing management in the supplemental DEIS, including the real "no action" alternative, i.e., current, pre-Rangeland Reform management, and the "ecosystem management" alternative previously submitted by CNPS.
4. Present, in the supplemental DEIS, essential information about all allotments which is already known to BLM but was omitted from the current draft, including, but not limited to, the following information:
 - a. whether the allotment is believed to meet the fundamentals of rangeland health;
 - b. whether it is in compliance with the S&Gs for each alternative including the fallback S&Gs;
 - c. whether objective monitoring data or only assessments based on professional judgment are available regarding riparian functioning, water quality, range condition, ecological status, etc.; and
 - d. whether the allotment has an allotment management plan (AMP).
5. Propose, in the supplemental DEIS, specific criteria to be used to identify "priority" allotments and present a management schedule for all such allotments that reveals the actions to be taken over the next three years to improve management, in accordance with Rangeland Reform '94 direction.
6. Present, in the supplemental DEIS a plan for changing current grazing practices prior to the start of the next grazing year for each allotment with known resource damage, in accordance with Rangeland Reform '94 direction.
7. Expand its implementation plan to include specific timelines and triggers for action and incorporate the plan (or alternative plans as appropriate) into the alternatives under consideration. The implementation plan should be sufficiently clear for members of the public and BLM staff to understand precisely how and when the S&Gs will be translated into on-the-ground management changes and practices and must be incorporated into affected land use plans.
8. Develop a monitoring plan and schedule for incorporation in all alternatives as well as affected land use plans along with the final S&Gs. The plan should identify the methods that will be used to monitor the health of different ecosystem elements as well as quantify the cost involved.

9. Expand, strengthen and clarify the draft best management practices (BMPs). The implementation and monitoring plans referred to above should address monitoring and implementation of BMPs.

NEPA Issues

A supplemental DEIS is needed.

The DEIS has numerous serious flaws which we detail below. It fails to comply with some of the most important requirements of NEPA. The DEIS does not analyze any real alternatives. It reveals important gaps in BLM data on ecosystem health. The majority of the information on range condition is based on subjective observation rather than scientific analysis. Because remedying these and other NEPA problems, as well as information gaps discussed elsewhere in our comments, would mean that the agency would be providing the public with a great deal of new information "relevant to environmental concerns and bearing on the proposed action [and] its impacts," a supplemental DEIS is required. (40 CFR § 1502.9(b)(1)(ii). Moreover, preparation of a supplement will unquestionably further the purposes of NEPA as discussed below (40 CFR § 1502.9(b)(2)).

The DEIS does not evaluate any true alternatives.

The DEIS does not evaluate any real options, let alone a range of alternatives. The purpose of an EIS and of NEPA is to allow decisionmakers and the public to evaluate a number of different alternative actions and their environmental consequences before decisions are made that affect the allocation of public resources and the environment (40 CFR § 1502.1). The analysis of alternatives is "the heart" of the NEPA process (40 CFR § 1502.14) and helps to ensure that the best decisions are reached. Yet, despite the critical importance of this part of the process, this DEIS does not analyze a range of alternative approaches to grazing management as required by NEPA (40 CFR § 1502.14). In fact, the DEIS does not include any real alternatives and fails to include at least two obvious alternatives: (1) current management, and (2) the ecosystem management alternative developed by CNPS.

The DEIS presents four putative alternatives. However, as indicated, they are essentially all the same. Two of those alternatives, 1 and 2, are virtually identical, both being drawn from the S&Gs produced by the RACs. Alternative 4 is also extremely similar to alternatives 1 and 2 because its standards, with the exception of the Water Quality Standard, are the same as in alternatives 1 and 2 (DEIS, p. 2-32). The remaining alternative, alternative 3, the fallback S&Gs, is also similar to the others because the language in the RAC S&Gs is drawn largely from the fallback standards and guidelines. The similarity among alternatives is extremely clear in Appendix 18 and Chapter 4: the environmental impacts of the alternatives are virtually identical. In addition, the language of all four alternatives is so vague (see below) that it is difficult to determine what the alternatives mean, much less discern any differences among them.

The lack of real alternatives violates a key requirement of NEPA. As a result the DEIS provides no opportunity for the public or BLM decisionmakers to compare substantively different approaches to the complex challenges of sustainable grazing management. If no alternative approaches have been considered, how is the public, the owners of these lands, to be assured that the BLM is pursuing the best course of action available?

16-1

The DEIS does not analyze the correct "no action" alternative.

The DEIS also does not present the correct "no action" alternative as required by NEPA (40 CFR §1502.14 (a) and (d)). This is an important omission. The correct "no action" alternative is current, pre-Rangeland Reform management. This alternative would give the public a benchmark against which to assess the new alternatives under consideration. It is essential to understand what would happen if current management remains unchanged in order to understand how conditions will change under the new S&Gs. Instead of analyzing a real "no action" alternative, however, the DEIS analyzes the fallback standards and guidelines from the Rangeland Reform '94 regulations, even though these S&Gs are not currently being implemented anywhere on BLM lands in California.

16-2

The DEIS' attempt to justify omitting an alternative that reflects the current management scheme is unpersuasive. The DEIS states (p. 2-29) that it does not contain an alternative reflecting the existing situation because the Rangeland Reform '94 regulations require that S&Gs be developed or that the fallback S&Gs be in place. Therefore, according to the DEIS, the pre-Range Reform situation "will change" and is neither the status quo nor the "no action" alternative. In fact, although the fallback S&Gs currently apply to BLM, little or no action has been taken to implement them. Therefore, the "no action" alternative is not in reality the fallback S&Gs. Rather, it is the management program that currently exists - which is still the program that pre-dates Range Reform throughout BLM-administered lands in California.

It is also noteworthy that at least one other EIS on S&Gs, the one prepared by BLM in Montana, did analyze "continuation of current [i.e., pre Range Reform] management" as its "no-action" alternative (See Attachment 1 to these comments). Similarly, in the EIS on Rangeland Reform '94, the BLM analyzed that same option - continuation of current management - as its "no action" alternative, even though it had already decided to change the then-current rules and policies. As the result of the inclusion of this alternative, the national EIS was able to project improvements in range health and contrast those improvements to current management. Had California BLM followed the same approach in this DEIS, this information would have helped meet the intentions of NEPA and would have allowed the public to fully understand and evaluate the benefits, if any, of the proposed action and other alternatives.

The DEIS does not analyze the CNPS "ecosystem management" proposal.

16-3

CNPS was asked by BLM to submit a proposal for a "rapid recovery" alternative last year. We invested a significant amount of time and effort in developing a thorough and thoughtful proposal. The proposal received extensive review by eminent range ecologists, botanists, wildlife ecologists and other scientists. Despite assurances from BLM staff that our proposal would be analyzed in this DEIS, it was not included. Nor was any explanation for its omission presented as required by NEPA (40 CFR §1502.14(b)).

BLM staff have told us that the alternative was not included because it was thought to contain "punitive" restrictions on grazing use. This is not the case. Our alternative would restrict grazing use only in cases where grazing management is shown to contribute to ecological damage. BLM staff also have stated that analysis of an "environmentalist" alternative would have forced them to include a "cattlemen's" alternative as well, which would be somehow undesirable. We cannot understand this reasoning. We feel that a proposal developed by the ranching community could well provide useful perspective and recommendations. It would be extremely appropriate, and entirely consistent with the intent of NEPA, to analyze a "cattlemen's" proposal in this DEIS. All sorts of citizens' alternatives are frequently included in EISs.

CNPS' proposal addressed the issues and concerns that we present in these comments and that were presented in the scoping comments of both CNPS and NRDC. CNPS' original proposal is

16-3
cont.

included as Attachment 2. We request that it be evaluated as an alternative in the supplemental DEIS, along with the "no action" alternative discussed above, or, at minimum, in the final EIS. We would welcome the inclusion of an alternative from the ranching community as well.

DEIS data are insufficient to enable the public to evaluate the alternatives.

NEPA regulations specifically require that an EIS must "provide full and fair discussion of significant environmental impacts" (40 CFR § 1502.1) as well as that the information provided "be of high quality. Accurate scientific analysis ... [is] essential" (40 CFR § 1500.1(b)), and the agency preparing an EIS must "insure the professional integrity, including scientific integrity, of the discussions and analyses" contained in it (40 CFR § 1502.24)). This DEIS fails to meet these requirements in numerous ways, described below.

First, the DEIS reveals large and important gaps in the BLM's data on grazed ecosystems. In fact, the data that are lacking are so important and so central as to directly call into question the Bureau's ability to manage livestock grazing adequately. In particular, the DEIS suggests that the Bureau has little in the way of objective information on current range conditions, as well as that it may even lack any information, including professional judgment information, for some of the lands under its jurisdiction. In fact, we believe that the BLM has far more information about the lands it permits grazing on in California than it has included in this document. For example, this document refers to, but does not present, information on specific grazing management problems on individual allotments (see, e.g., Table 4.3.1 and 4.3.1.a).

The DEIS relies heavily on professional judgment to evaluate the current condition of grazed BLM lands. The DEIS does not reveal exactly how many acres or miles of stream were evaluated using professional judgment as opposed to more quantitative measurements. A footnote to Table 3.4.1(a) states that "much" of the data on ecological condition came from "professional judgment assessment." However, Chapter 3 does state that professional judgment was used to evaluate the range condition of up to 3.1 million acres and the trend of up to 4.3 million acres of uplands.

16-4

There are several problems with relying heavily on professional judgment. It is subjective. Different observers, even with excellent training and intentions, often reach radically different conclusions. It is vulnerable to pressure. It can be difficult for agency staff to take personal responsibility for a statement that public resources are damaged by grazing. For these reasons, objective measurements should always be provided, at least for a subset of observations, so that the public can verify the results of subjective estimates of ecosystem condition. Photographs, using repeatable photo point methodology, can also be useful in this regard. Objective measurements also assist agency staff by helping to calibrate subjective estimates. NEPA requires that monitoring results be provided to the public upon request (40 CFR § 1505.3(d)). We request that the supplemental DEIS and final EIS separately display the information that is based on objective and subjective observations.

Even professional judgment was apparently unavailable for almost 700,000 upland acres which remain "unclassified" according to Appendix 7, and for 268 allotments for which insufficient information exists for an impact assessment according to Chapter 4. As noted elsewhere, the DEIS presents no monitoring schedule so the public has no way of knowing when these important data will be gathered. There is no way for the BLM to adequately manage grazed ecosystems with no information on their current condition. The supplemental DEIS and final EIS should include a timetable for gathering missing information on current condition, including allotment health, as well as a monitoring plan and schedule.

Equally troubling is the extent to which the text of the DEIS undermines the validity of the quantitative information it does present, rather than assure readers of its high quality and integrity. This is particularly true of the quantitative information on range condition (see, e.g.,

pp. 3-35 - 3-38 for discussion of the ecological site inventory (ESI)). If, as this discussion suggests, even the data that the BLM has are of extremely limited usefulness, then one must question on what basis the agency justifies continuing to allow livestock to graze the public lands. We also must question the basis for the management decisions and management proposals in this DEIS. Does the BLM really intend to say here that few or none of the data it has collected until now can be used for present purposes (whatever they are) - and does it really expect the public to accept this position?

16-4
cont.

The DEIS also omits some important information. For example, Chapter 3 presents general data on soil condition (p. 3-18). However, the location, type, and source of the soil condition problems on 120,000 acres are not disclosed. Survey methods for soil condition (infiltration rate measurements, line or frequency transects, relieves, etc.) are also not described, although NEPA requires that methods be disclosed (40 CFR § 1502.24). A footnote to Table 3.3.1 states that site specific soils information will be developed as the BLM "actually complete[s] inventories....," although in this case, as in others, the DEIS provides no hint as to when these inventories will in fact be completed. In any event, it is not clear what site specific information, if any, is currently available for soils.

The discussion of the impacts of grazing on soils is fairly general in this DEIS. CNPS has recently prepared a literature review on grazing impacts to soils which we submit as Attachment 3 to these comments. The information in the review may be useful during the development of the supplemental DEIS.

Another example is provided by ecosystem condition. No information is presented on how many acres of different ecosystem or plant community types are not functioning properly. These data could be very useful. For example, if oak woodlands are more likely to experience damage than chaparral, the BLM could focus restoration efforts in these communities. The BLM apparently has some of this information: for example, the DEIS contains estimates (albeit inconsistent ones) of the number of allotments that are currently failing to meet one or more of the fundamentals of rangeland health, (see e.g., p. 4-3), but no specific information about any of those allotments is provided.

Environmental consequences are inadequately assessed.

16-5

The environmental consequences section also has serious flaws. It contains very general and broad descriptions and presents little plant community- or allotment-specific information on projected ecosystem condition under any of the alternatives. The information that is presented appears to be based largely on guesses rather than on scientific analysis. For example tables 4.2.3 and 4.2.3.a. show the percentage of riparian areas that would be in proper functioning status under the alternatives. The vast majority of the information in those tables, both on current and future condition, is based on professional judgment according to page 4-8. We discussed the problems with professional judgment earlier in these comments.

Little attempt is made to estimate the specific length of time that will be required to improve ecosystem health under the various alternatives. The DEIS states (p. 4-21) that the implementation of alternative 1 is "predicted to be completed within 15 years," a timeframe that is wholly inconsistent with the intent of Rangeland Reform '94 that improvements be accomplished in a timely manner, as well as with key regulatory deadlines for action discussed elsewhere in these comments. With respect to alternative 4, the only statement made is that it may improve some aspects of ecosystem health "faster" and alternative 3 may improve some aspects of ecosystem health "slower" than alternatives 1 and 2 (p. 4-7; Appendix 18). This vagueness makes it difficult for the public to understand the specific relative merits of alternative 4 vs. alternatives 1, 2, and 3.

16-5
cont.

Chapter 4 presents some information on expected changes in grazing management on differing numbers of allotments under the alternatives 1, 2 and 3 vs. alternative 4. Tables 4.3.1 and 4.3.1(b) show the number of allotments that would require management changes under alternatives 1 and 4. However, it is difficult to understand why different numbers of allotments fail to meet standards under alternatives 1 and 4. The standards in alternative 4 are identical to those in alternative 2 (DEIS, p. 2-32) which, according to Chapter 4, would have virtually the same impacts as alternative 1. Therefore it would seem that at least 97 allotments do not meet standards under alternatives 1, 2 or 4 and probably fail to meet alternative 3 as well.

The DEIS does not specifically describe how BLM staff converted the standards and guidelines into proposed changes in management. It appears that, again, much reliance was placed on professional judgment, rather than the application of objective, quantifiable, repeatable standards, to propose management changes. We request that the supplemental DEIS include a list of which allotments fail to meet standards under the alternatives as well as a clear explanation of how the numbers of allotments failing to meet standards under each alternative was determined.

Comments on standards and guidelines

In order to achieve the goals of Range Reform '94, and meet public expectations, i.e., real on-the-ground improvement in current conditions, the S&Gs must be meaningful and specific and they must provide agency field personnel with sufficient and understandable guidance to ensure that necessary changes in management are identified and carried out. Regrettably, few of the proposed S&Gs meet these tests.

The standards and guidelines are unacceptably vague.

The proposed S&Gs in all alternatives are generally much too vague to have any meaning for the public, BLM staff, or on-the-ground grazing management. As such, they fall far short of the kinds of S&Gs that the Interior Department and the agency promised the public would be produced by the states with the assistance of the RACs, following adoption of the Range Reform regulations.

In promulgating the Range Reform rules, the Interior Department explicitly recognized that

"line managers need clear authority and guidance to help correct problems in grazing use and to improve the degraded condition of some areas expeditiously." (60 Fed. Reg. 9907 (February 22, 1995)).

16-6

Accordingly, the Department asserted that the S&Gs would

"provide specific measures of rangeland health [as well as] identify acceptable or best management practices in keeping with the characteristics of a State or region such as climate and landform. State ... standards and guidelines will provide the measures and guidance needed to develop terms and conditions of permits, leases, ..., [and] allotment management plans, ... in a manner that will result in maintaining or making significant progress toward healthy, functional rangelands. (*Id.* at 9954.)

The Department emphasized that the S&Gs would be more specific than the fallback standards and guides which it described as "relatively general" and which it noted

"cannot be as specific or detailed as State or regional standards and guidelines that will be tailored to the conditions and needs of each State or region." (*Id.* at 9955).

The proposed standards, however, are virtually identical to the fallback standards as are numerous guidelines - and all the S&Gs presented in this document, including the rapid improvement alternative, use language that is extremely general, non-specific, vague and subjective.

The S&Gs are dominated by statements such as:

16-6
cont.

"Precipitation is able to enter the soil at appropriate rates; the soil is adequately protected against accelerated erosion; and soil fertility is maintained at appropriate levels...." (Bakersfield, p. 2-6)

"Where appropriate, there is adequate woody debris." (Ukiah, p. 2-15)

"Development of springs, seeps and other water related projects shall be designed to promote rangeland health." (Susanville, p. 2-23)

"[T]he appropriate kinds and amounts of soil organisms, plants and animals to support the hydrologic cycle, nutrient cycle and energy flow will be maintained or promoted." (Guideline 8, Alternative 4, p. 2-34)

This vague language may read well, but it has little specific meaning for grazing management in the field. How should the public, or BLM staff, interpret such S&Gs? Why are no provisions present in most S&Gs, or the implementation plan, to actually trigger changes in grazing management, if ecosystem health is deteriorating. We are alarmed at the expectation that somehow BLM staff will be able to translate these vague statements into management actions such as changes in season of use, utilization levels, herd management, location of water developments, etc. This document does not provide adequate guidance for BLM staff or the public to understand how or when that is to be accomplished, notwithstanding the Department's explicit promise that the S&Gs and associated allotment review process would do just that.

Utilization

16-7

We welcome the inclusion of some utilization limits in the S&Gs. Utilization limits are essential to proper grazing management (e.g. Clary and Webster, 1989). We are concerned, however, that many of the utilization limits presented allow too much use to effectively restore ecosystem health. We recommend that no limits be adopted that allow greater use than the alternative 4 limits. The limits in alternative 4 are based on scientific studies evaluating the effects of grazing on ecosystem health (see Holecheck et al., 1995), while many of the utilization limits in the other alternatives are based on judgment, including the judgment of laypersons.

Note that utilization limits, and the associated improvements in ecosystem health, often result in a substantial increase in both the quantity and quality of forage. Many studies have shown that moderate or even light use can result in greater economic returns to the livestock operator than heavy use (see Attachment 4). Utilization limits, therefore, often lead to improvements both in the health of the ecosystem and the finances of the rancher.

16-8

We are also concerned that no limits on browse utilization are presented. As the CNPS' ecosystem management proposal noted,

"Allowed utilization for woody species should be incidental use or <5% of annual leader growth. Woody species are not part of the forage base. Woody species generally are not used by cattle until available herbaceous forage has been consumed, dried to unpalatability, or has otherwise become unavailable (Bronson, 1992; Elmore and Kauffman, 1994; Clary and Webster, 1989; Loft et al., 1987). Because browsing

16-8
cont.

occurs after other forage sources are exhausted, overuse and severe damage of browse species (willows, oaks, shrubs, etc.) can occur very rapidly after browsing has commenced."

Browse limits for riparian and upland species should be added to the S&Gs.

Comments on alternative 4

16-9

Alternative 4, the "rapid improvement" alternative, is not significantly different from alternatives 1,2 or 3. It uses identical vaguely worded standards to those in alternative 2. Therefore it suffers from the same basic problem: how are these standards to be translated into changes in grazing management and when? The first two guidelines in alternative 4 begin with the words "if monitoring or verified observation indicates...." (pp.2-32, 2-33). However, alternative 4, like alternatives 1,2, and 3, does not include a monitoring plan (see below). There is no assurance, therefore, that sufficient "monitoring or verified observation" will occur to produce meaningful management improvements. Where specific direction is given as in guideline 6 (p. 2-34), vague wording is added so that the specific direction becomes meaningless. For example, guideline 6 reads:

"A 4-6 inch minimum stubble height will remain ... in most riparian areas. [...]
Adjustments ... to these limits may be made based on ... desired resource conditions."
(emphasis added)

It is impossible to determine from this when, if ever, a minimum stubble height will be implemented.

The supplemental DEIS should explain exactly how implementation of alternative 4 will differ from the other alternatives.

Absence of a suitability standard

16-10

None of the S&Gs presented in the DEIS contain a standard that requires the identification of lands suitable for grazing. We regard this as an extremely regrettable omission.

Livestock grazing has significant impacts on ecosystem values and other uses. Accordingly, it should be viewed in the context of all other uses and specifically in light of its economic and environmental consequences as well as of the alternative uses foregone. A standard requiring identification of lands as suitable - or not - for grazing, based on economic and environmental analyses that incorporate foregone alternative uses, should be an integral part off any S&Gs that are adopted.

Conditional endorsement of alternative 4

Although alternative 4 suffers from many problems including its lack of clarity, a monitoring plan, and timelines, the DEIS analysis reveals it would accomplish improvements in ecosystem health faster than the other alternatives. The DEIS does not provide sufficient information for us to understand exactly how or when this improvement is to be achieved. However, we would endorse the selection of alternative 4, if the omitted assurances and timelines for its implementation were added to it.

According to Table 4.3.4.1 (p. 4-28), the total employment change due to the selection of alternative 4 as compared to the other alternatives would be a loss of only nine jobs in all of California. It does not therefore appear likely that the selection of alternative 4 would create

irreparable economic damage while, according to the DEIS, it would yield significant environmental benefits.

Monitoring

No monitoring plan is presented as part of any alternative considered in this DEIS. This is extremely unfortunate. Without a monitoring plan, there is no way for the public or permittees to evaluate the quality of the information upon which BLM will base its management decisions under these S&Gs. Without a monitoring plan and a budget, there is no way to assess the likelihood that the BLM's new approach to range management will be carried out. Chapter 3 does include a good, although general, discussion of monitoring techniques, but it does not state which, if any, of these methods will be used or, more importantly, when they will be used.

The section in Chapter 2 on S&G implementation states (p. 2-3):

"The implementation process will follow four basic steps, including an initial screening, management change, monitoring and additional inventory or assessment."

16-11 This is a reasonable approach. However, without a specific monitoring schedule and timelines, it may not lead to management changes on the ground. We are concerned that without specific timelines we will see very slow implementation of these S&Gs, if they are implemented at all.

This issue is of particular concern given the severe resource shortages within BLM. Many Resource Areas do not have adequate staffing in fisheries, botany, soils, wildlife, or even range management. Under these circumstances, it is essential that the agency develop a well thought out monitoring plan to carefully allocate scarce staff to gather the information needed to properly manage grazing.

Monitoring has long been the Achilles heel of the BLM's range program in California and throughout the West (e.g., U.S. General Accounting Office, 1992)). Indeed, according to this DEIS, California BLM not only has generally failed to do the monitoring that was the basis of the pre-Range Reform grazing program, it has equally generally failed even to do the inventorying that is a prerequisite for monitoring (DEIS Section 3.3.3). Under these circumstances, the BLM has an obligation to provide the public with a specific monitoring plan and projected budgets that will accomplish the goal of Range Reform '94 in the supplemental EIS as well as in the final - an obligation which NEPA underscores (See, e.g., (40 CFR § 1505.3).

A monitoring plan must be included in all the alternatives considered in the supplemental DEIS and in the final EIS -- as well as incorporated in every affected land use plan along with the final S&Gs. The supplemental EIS must also provide more information about the allotment evaluation process that will be followed.

Implementation

16-12 The DEIS contains little specific or clear information on timelines for implementation of S&Gs or for improvement of ecosystem health. This makes it difficult for the public to understand how or when we are to see corrections to improper grazing management.

Chapter 4 does present some general information on implementation. It states that 16,267 AUMs would be eliminated within 1-5 years under alternatives 1, 2 and 3 and that 35,901 AUMs would be eliminated under alternative 4 (pp. 4-22, 4-24). However, it does not say where these reductions would take place or what S&Gs would result in the reductions. As noted above in our comments on the environmental consequences section, we do not understand why the numbers of

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allotments and acres not meeting standards under alternative 4 and under other alternatives are different, because the alternative 4 standards are identical to those in alternative 2 (p. 2-32). To address this confusion as well as the other concerns we raise regarding implementation, we suggest again that the supplemental DEIS clearly disclose which allotments are not meeting standards, which specific standards are currently being violated on each allotment, and when management corrections will be made.

16-13

Another aspect of the implementation plan referred to in Chapter 2 also concerns us. On page 2-3, the plan states that after grazing management-related ecosystem damage is identified, the NEPA process will be used to make a decision regarding management changes. What exactly does this mean? What kind of NEPA process is being referred to and how does the BLM intend to manage that process so as to minimize needless further delay in identifying and making critical improvements in grazing management? How will the BLM ensure compliance with the one year deadline for remedial action that has been imposed by the grazing regulations (43 CFR § 4180.1(a))? We request that the supplemental DEIS or the final EIS clarify how this NEPA process will be used to improve grazing management.

Finally, according to the Rangeland Reform regulations, there are at least two specific implementation phases that must be initiated:

1. management must be changed on allotments with known grazing damage before the next grazing season; and
2. other priority allotments must be addressed within three years.

The BLM must address known grazing damage before next season.

16-14

The DEIS does not include information on how or when the BLM will address the known range health problems disclosed in the DEIS itself. The Rangeland Reform '94 regulations (43 CFR § 4180.1(a)) require the BLM to take action to improve ecosystem health no later than the start of the next grazing year upon determining that watersheds are not in, and are not making progress toward, properly functioning physical condition. The information in Appendix 7 clearly shows that the vast majority of BLM lands are not currently in properly functioning physical condition, whether condition is measured as range condition or ecological status. Table 3.4.1(a) also shows that the majority of riparian areas are not in proper functioning condition. The DEIS does not disclose which of these improperly functioning BLM lands are deemed to be "making progress toward" properly functioning condition and which are not.

The DEIS (pp. 3-16, 4-3) also states that at least 82 allotments do not currently meet one or more of the fundamentals of rangeland health due to grazing management problems. The regulations direct the BLM to take action "not later than the start of the next grazing year" to address these problems as well (43 CFR § 4180.1). The supplemental DEIS and the final EIS should include an allotment management schedule stating (1) exactly what lands or allotments require management change before next season under the regulations and (2) what actions will be taken to address the problems.

16-15

In addition, California BLM is currently operating under the fallback S&Gs pursuant to § 4180.2(f) of the regulations. The fallback S&Gs set several important standards for ecosystem function and requirements for management. What steps, if any, are being taken to implement the fallback standards and guidelines? The BLM has an obligation to provide the public with information similar to that outlined above. Specifically, the BLM must develop and publish a concrete plan, with a specific timetable, pursuant to which it will apply the fallback S&Gs to known high priority allotments within each California district. It simply cannot expect the public to assume that this important work will be done.

To assist the BLM with its duty to address known grazing problem areas, apply the fallback standards and review priority allotments, we identify below the allotments where management attention is sorely needed. These allotments are among the many the agency knows have serious grazing conflicts and damage, even though it may not in fact have all the information it would like to have - and we would like it to have - regarding current resource conditions and grazing problems.

Horse Pasture Ridge Allotment

This Arcata Resource Area allotment contains two Wilderness Study Areas (WSAs) -- Eden Valley and Thatcher Ridge. Both WSAs are very important ecologically with extensive rare plant habitats and high value anadromous fish watersheds. On the east side of the Eden Valley WSA, around Bennett Valley, trespass grazing is known to be occurring and is affecting anadromous fish habitat along Elk Creek, a tributary of the Middle Fork of the Yolo River and a potential Wild and Scenic river. The WSA on the other side of this allotment, Thatcher Ridge, together with associated Forest Service roadless areas, forms a key wildland area of 74,000 acres. Grazing in this WSA is believed to be responsible for the ongoing conversion of native vegetation in meadows to tar weed.

Ord Mountain Allotment

This Desert District allotment includes WSAs and rare plants as well as habitat for listed species such as the desert tortoise and bighorn sheep. Unlike some BLM allotments, it has been monitored, most recently in 1996. According to the monitoring report, utilization levels are excessive, "there is a livestock distribution problem," forage species, which include native grasses, exhibit "poor age structure, low densities and poor vigor," and "[t]he current 'grazing system' needs to be re-evaluated and modified as needed." Members of CNPS have visited the allotment on several occasions, most recently two weeks ago, and have reported "shocking" damage to soils and plant communities, particularly around water sources.

Carrizo Plain

This Area of Critical Ecological Concern within the Caliente District includes several allotments. Carrizo Plain is the largest remaining contiguous fragment of California grassland in the state. The area contains many rare plants including several listed species. There are also several listed animals in the area, such as the giant kangaroo rat. Soda Lake provides wintering habitat for rare birds including sandhill cranes, and many species of raptors. Grazing management in the area is poor. Cattle are supposed to be managed to protect and restore the valuable resources of the plain, but they frequently trespass into areas that are supposed to be protected. Erosion and soil surface damage from trampling, particularly of wet soil, is severe in many areas. Soda Lake receives runoff that is contaminated with feces, urine, and sediment from soil disturbance. CNPS members and others have repeatedly expressed serious concerns to BLM regarding the management and condition of this exceptional area.

Twin Peaks Allotment

This Susanville District allotment has long been of concern to many because of its outstanding natural resource values and serious grazing conflicts. The allotment includes several WSAs, is used throughout by wild horses and burros, and is home to California and Nevada's blue ribbon mule deer herd. Although riparian areas constitute only a small percentage of the acreage in this allotment, BLM has acknowledged in the past that they were being seriously abused as a result of overgrazing by livestock. In 1993-94, the Bureau conducted an evaluation of conditions in this allotment which confirmed these and other problems. Since then we understand the allotment's

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cont. | riparian areas were assessed to determine which, if any, were in proper functioning condition. We further understand that this assessment and other information available to the Bureau reveal that grazing is continuing to cause serious resource damage.

Action on priority allotments must occur within three years.

In promulgating the Range Reform rules, the BLM and the Interior Department made commitments to the public regarding the completion of allotment screening within a three year period, at least for high priority allotments:

"all high priority grazing allotments would be reviewed for the need to modify terms and conditions to ensure conformance ... within three years of the effective date of this rule." (59 Fed. Reg. 14327).

16-16 | Priority status is to be based largely on a review of riparian conditions in allotments (59 Fed. Reg. 14327). The DEIS contains no reference to that three year period or to the use of riparian condition as a key criterion for high priority status. On the contrary, the DEIS clearly implies that the Bureau has no obligation to complete its review by any specific date (up to at least 15 years from the date of the final EIS and Record of Decision). The DEIS also presents no information regarding either the content of the criteria that will be used to determine whether an allotment is a high priority one, or the timeline for their development.

We call upon the BLM to develop an implementation plan, complete with budgets, that will enable screening of high priority allotments to be completed by August 21, 1998, and to include that plan in the supplemental EIS along with at least a list of allotments that should be denominated high priority because of riparian damage. If the Bureau believes that there are additional allotments that should be considered high priority because of the condition of other resources, those allotments should also be included. The public should be invited to comment on the proposed allotments and to submit other nominations as well.

Interim S&Gs are needed.

16-17 | Because of the tremendous difficulty involved in translating the vague statements about ecosystem health that make up most S&Gs into site specific guidance for changes in grazing management, interim S&Gs are needed. Interim S&Gs will provide BLM managers with measures they can implement immediately while allotment evaluations are being made. For this reason, the Susanville RAC proposed some transitional guidelines (Guideline 14, p. 2-24), along with a monitoring plan. Although these guidelines are incomplete and weak, we support their implementation on allotments where utilization standards are currently absent.

The BLM has not complied with its own planning regulations.

16-18 | According to the Bureau, this EIS is being prepared not only to serve as the NEPA document for adoption of final S&Gs, but also for amending the land use plan provisions relating to livestock grazing throughout the State. The EIS, however, fails to comply with a key regulatory requirement for plan amendments.

The BLM's planning rules specifically address the plan amendment process. In particular, they direct that "[i]n all cases, the effect of the amendment on the plan shall be evaluated." (43 CFR § 1610.5-5 (emphasis added)). This DEIS wholly ignores that directive. It contains no evaluation of the effect of amending any land use plan in the state to include the proposed S&Gs. While it asserts that the S&Gs are consistent with existing plan provisions, it provides no support for that assertion and, in particular, provides no information about specific grazing provisions of

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any plan that will be affected by such an amendment. (Such information about current management as the DEIS does contain is scattered throughout the document (See, e.g. p. A5-1 discussing the M-I-C process) while the information about plans that is provided is extremely limited and somewhat confusing - Appendix 4 contains the names, dates and geographic areas of plans and some, but apparently not all, of the plan amendments that have been completed.)

The DEIS's assertion that the S&Gs are consistent with existing plans is not only unsupported, it is simply not credible: public land grazing management practices must be consistent with BLM land use plans (43 CFR § 1610.5-3) and, as the BLM recognized in promulgating the Range Reform rules, resource conditions will deteriorate unless current practices are changed. If, as both the Range Reform DEIS and this DEIS assert, public land conditions will improve under the new rules, it must be as the result of changes to practices permitted by plans, and thus to changes in plan provisions! In any event, the Bureau should consult the environmental documents that have been prepared in connection with plan amendments to establish what needs to be done and what kinds of information need to be provided to achieve its purposes with respect to S&Gs.

Weeds

16-19

Non-native invasive weeds are one of the most serious threats to California ecosystems. They are also among the most important economic threats to the livestock industry. The DEIS does briefly discuss some of the problems caused by weeds in grazed plant communities. It also discloses that weed problems are widespread on BLM grazing allotments (p. 3-18). The DEIS does not disclose what percentage of allotments have been surveyed for non-native weeds. All four alternatives state that actions will be taken to combat weeds. However, the alternatives do not present any schedule for weed surveys on allotments, or for eradication of known infestations. We suggest that alternatives in the supplemental DEIS include a weed inventory and management program and budget.

Management of special status plants

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The treatment of special status plant species (SSPS) in this DEIS is extremely weak. This DEIS and the Range Reform process present the BLM with the opportunity to determine the impacts of grazing on SSPS and to adjust management accordingly. None of the alternatives in this DEIS take advantage of that opportunity. Livestock grazing has caused or contributed to the rarity of many California native plant species (Calif. Dept. Fish and Game, 1984-1993; Skinner and Pavlik, 1994). This DEIS covers 4.4 million acres of grazed plant communities in California and Nevada which provide habitat for at least 149 SSPS (DEIS p. 3-52), including state and federally listed species.

The discussion of SSPS in Chapters 3 and 4 is very superficial and requires expansion in the supplemental DEIS. According to the BLM, in 1992, more than 6 million acres of BLM lands had not yet been inventoried for SSPS (Willoughby et al., 1992). DEIS Chapter 3 does not disclose which, if any, of these needed inventories have been performed. There is no way for the BLM to understand the impacts of grazing on SSPS if it does not even have basic information on their location. In addition, if the majority of BLM lands remain unsurveyed, how is the public or the BLM to be assured that the SSPS list in Appendix 11 is complete?

In Chapter 4, species are divided into groups based on their expected responses to the alternatives. No explanation is given of how the determination of impacts to the species was made. As with most other environmental parameters, the DEIS' analysis does not reveal any differences among the impacts of the alternatives on special status plants, except that alternative 4 is expected to impact the species "faster" than the other three alternatives (p. 4-15,16). The lack

of any differences among impacts of alternatives provides further support for our conclusion that there are no real alternatives presented in this DEIS.

Appendix 11 displays information on the effects of livestock grazing on the species under current management. Appendix 11 does not clearly explain how the grazing effects were determined, but BLM staff have confirmed that essentially all the information is based on professional judgment. We have discussed the problems with professional judgment earlier in these comments.

Appendix 11 states:

"....grazing during the active growing season is considered negative, but grazing following the growing season is considered positive because it reduces the amount of residual dry matter and the resulting competition...." (p. A11-1)

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While this statement is sometimes true, it is certainly not universally true. If this theory was a primary criterion for assessing grazing impacts to SSPS, then the assessments are seriously flawed.

Grazing may harm plants following the growing season in many ways (see, e.g., Fleishner, 1994). Grazing animals may consume perennial species throughout the year. They may trample the soil and damage or destroy above and below ground plant parts and seedbanks. They may damage habitat through deposition of urine, feces, or sediment which alters the soil nutrient or chemical status. They may damage habitat by altering the microclimate through consumption or trampling of overstory vegetation. They may alter hydrologic cycles by facilitating gullying or stream channel changes. Any of these impacts, and others we have not listed, may negatively impact SSPS following the growing season. We suggest that the supplemental DEIS discuss the methods used to determine grazing impacts to SSPS more fully.

Some of the information in Appendix 11 conflicts with information in the Inventory of Rare and Endangered Vascular Plants of California (Inventory) (Skinner and Pavlik, 1994), which is widely cited as the premier scientific reference on rarity in California flora. Several species which are designated in Appendix 11 as being unaffected or positively affected by grazing are listed in the Inventory as possibly threatened by grazing and/or trampling. These species are:

Antirrhinum subcordatum
Calamagrostis foliosa
Calochortus Greenei
Caulantus californicus
Cupressus arizonica ssp. nevadensis
Eriogonum prociduum
Ivesia webberi
Layia heterotricha

Lupinus spectabilis
Mimulus pictus
Paronychia ahartii
Polygonum polygaloides ssp. esotericum
Senecio lyneae
Streptanthus oliganthus

16-21

This conflict between the information in the DEIS and information in the Inventory concerns us. The alternative submitted to BLM by CNPS contained a guideline for SSPS management where the response to grazing is not known:

If a rare or sensitive species is present, but inadequate information is available on grazing impacts, species, a multi-year scientifically sound (peer reviewed) monitoring and evaluation program (conservation strategy) will be developed and initiated immediately. Possible mitigations will also be developed and will be included, on a conditional basis, in the management plan (AMP, Land Use Plan, Resource Area Plan).

If after an appropriate monitoring period (1-4 years), grazing is found to be detrimental to the species OR if monitoring is not performed, then mitigations will be implemented. Conditional mitigations to be considered will include (1) adjusting season of use, (2) increases in minimum allowed stubble height (reductions in allowed use) in sensitive plant habitat, or (3) closing affected pastures to grazing.

Where an approved ecosystem management plan, habitat management plan, recovery plan, conservation strategy or other management plan exists for one or more rare species, an evaluation and report will be made of whether the plan is being implemented and monitored.

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This mirrors, in many ways, BLM's own policy on SSPS management (California BLM Manual Supplement 6840.06 (March 25, 1996)). We recommend that the strategy quoted above be followed for all species for which there is any doubt as to the impacts of grazing. Doubt certainly exists for species listed in the Inventory as being possibly threatened by grazing or trampling. Exclosure studies are the generally accepted method for determining grazing impacts to rare plants and other resources. We suggest that exclosure studies be initiated immediately for the species listed above. We may be able to assist in these studies. CNPS members include many skilled amateur and professional botanists. There may be locations where CNPS volunteers can help the BLM to establish or monitor SSPS studies. Please contact Emily Roberson, if CNPS can be of assistance in this effort.

16-22

Appendix 11 lists 26 species that are known to be negatively affected by current grazing management. Although Chapter 4 does state that impacts will be reduced, nowhere in the DEIS is any information provided regarding what exactly will be done to reduce these known negative impacts, or when the mitigation will take place. The supplemental DEIS should clearly explain what measures will be taken to protect these species from further damage. The supplemental DEIS should also include a schedule revealing when these measures will be implemented.

We further recommend that the supplemental DEIS include a survey or inventory schedule disclosing when allotments or portions of allotments that have not been surveyed for SSPS will be surveyed.

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Finally, we are aware that some Resource Areas, particularly in the Desert District, do not employ a full time botanist. It is very difficult for the BLM to meet its obligations to protect SSPS under the state and federal Endangered Species Acts and Rangeland Reform '94, to comply adequately with NEPA, or to properly manage native plant communities generally, without adequate staffing in botany. The BLM's 1992 plant management strategy (Willoughby et al., 1992) found that 12 additional botany staff were needed in California. We hope that botanical staff will be promptly added to Resource Areas where they are currently absent.

Water Quality and the Clean Water Act

Section 313(a) of the Clean Water Act (CWA), 33 U.S.C. § 1323(a), requires federal agencies to conform their activities to federal and state water quality standards (WQS) and regulations. Marble Mountain Audubon v. Rice, 914 F.2d 179, 182 (9th Cir. 1990); ONRC v. U.S. Forest Service, 834 F.2d 842, 848 (9th Cir. 1987); Northwest Indian Cemetery v. Block, 795 F.2d 688, 697 (9th Cir. 1986), rev'd on other grounds 485 U.S. 439 (1988) all hold that federal land management activities must comply with state WQS under § 313 of the CWA. This requirement extends to both "point source" and "non-point source" activities permitted by federal agencies which may affect water quality, *id.*, and applies to BLM's management of grazing on public lands in California as the DEIS concedes. The DEIS treatment of water quality, however,

concerns us because it strongly implies that the BLM is not now complying with its duties under the CWA.

Although the DEIS does not inform readers, the state of California has adopted State Basin Plans for all inland waters, including those located on or flowing through BLM-administered lands, in order to ensure that state waters attain the fishable/swimmable goals and other requirements of the CWA. These plans identify beneficial uses for the waters in each basin and set out WQS that must be met to achieve or preserve those uses. Most of the waters in the state have multiple beneficial uses which typically include non-contact and contact recreation, wildlife and fisheries among them. To attain or preserve these uses, numeric WQS have been established for many, if not all, of the waters covered by this EIS. (See, e.g., Central Coast Basin Plan). For cold water aquatic habitat on approximately 350,000 acres of BLM lands covered by the Central Coast Plan, for example, numeric WQS have established for pH, dissolved oxygen and temperature.

Indeed, Channel Islands National Park is currently operating under a Cleanup or Abatement order from the Central Coast Regional Water Quality Control Board due to improper grazing management practices which have contaminated waters on Santa Rosa Island. The island, like many BLM lands, is extremely remote and used only for recreation. However, it is still required to comply with the applicable numeric WQS.

Unfortunately, the DEIS suggests that clean water standards are still not being met, or even monitored, on at least some BLM lands. Statements such as:

"[T]here is ... not yet a complete assessment of non-point source problems, particularly those related to livestock grazing on public lands. (p. 3-45)

"To date, conformance with and enforcement of these standards on livestock waters has not been a high priority with the State...." (id.)

strongly imply both that clean water standards are not currently being met and also that compliance with standards is unlikely to result from this DEIS. In fact, discussions with BLM staff have indicated that it may be the policy of some within the agency to deliberately avoid implementation and enforcement of water quality standards in some places.

The DEIS does acknowledge that grazing on public lands is causing water quality problems, even though monitoring data are incomplete. For example:

"There are also some areas within central California where public land livestock grazing activities are suspected to contribute to the acceleration of impairment.... However, specifics ... have yet to be determined." (p. 3-45)

The riparian data and information about fish presented in the DEIS further suggest that the number of problem areas may be larger than the discussion of water quality in Chapter 3 implies. (See, e.g., Table 3.4.1(a), p. 3-52).

However, even where specific water quality problems are known to exist, only "some" of the problems have been resolved (p. 3-44). The DEIS does not elaborate regarding the location of areas involved, their number, or management changes made or contemplated in response to these water pollution problems.

16-24 The DEIS and alternatives present little hope for improvement in either water quality monitoring or water quality itself. According to our analysis, as well as the DEIS' own analysis in chapter 4 and Appendix 15, none of the alternatives include adequately specific timelines, standards

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and/or guidelines to ensure that water quality will be improved on BLM lands throughout California (p. 4-27).

Best Management Practices

The BLM is required to acquire state certification of compliance with the Clean Water Act for all permitted activities (CWA § 410(a)). The DEIS implies that the Best Management Practices (BMPs) currently in development will meet that requirement. However, the draft BMPs displayed in Appendix 10 are worded just as vaguely as the S&Gs in the alternatives, with all the associated problems that we have discussed above. They also fail to include a monitoring plan or timelines for implementation, problems which we have also discussed earlier. In essence, the draft BMPs are simply a laundry list of general actions that may, or may not, be taken to protect water quality. For example,

"3. Determine the kind and class of livestock to graze compatible with meeting management objectives.

* * *

7. Establish the appropriate populations levels for WHBs to sustain healthy viable herds and maintain populations within these levels."

16-25

(p. A10-3), are essentially meaningless statements because they lack any specific objective measures.

Appendix 9 provides a useful contrast to the draft BMPs. Although also somewhat vague, the Nevada BMPs are much more complete and specific than those proposed for California. The Nevada BMPs include clearer mandates such as the one recommending recording the use of key species (BMP 7-9). Comparison of the two states' BMPs for facilities illustrates the difference between them.

The Nevada BMP states, among many specific recommendations:

"Facilities should not be located in or near an streamside management areas." (BMP 7-11)

The California draft BMP states:

"Placement and design of ...facilities...will be in such a matter as to minimize concentrations of livestock use near areas subject to discharge of sediments and animal waste to water bodies. [...] areas will be located and designed to stabilize conditions as much as possible...." (BMP 6).

Clearly the Nevada BMP will be both easier to implement and more effective than the vague California draft BMP.

16-26

What is more, even if the BMPs contained objective and specific language and even if BLM were to actually implement them, BLM could not simply assert that it was in compliance with California's WQS. See Northwest Indian Cemetery, 795 F.2d at 697. Indeed, we understand that an Oregon law¹ it has recently forced the federal government to monitor the effectiveness of BMPs in meeting numerical water quality standards. We suggest that the current draft BMPs are unlikely to achieve compliance with water quality standards and that they therefore will not withstand a test of effectiveness monitoring in California.

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We recommend that the BLM, the Water Resources Control Board, and the Regional Water Quality Control Boards expand, strengthen, and clarify the draft BMPs. We further recommend that the draft BMPs be subjected to scientific peer review and additional public comment and that an effectiveness monitoring program, and schedule, be added to the Draft BMP proposal. Finally, we recommend that the BLM integrate its BMP program with its program for complying with S&Gs, both currently (i.e. the fallback S&Gs) and in the future.

Concerns with some assumptions underlying the analysis

Some of the assumptions underlying the DEIS analysis set out on p. 1-7 are puzzling.

Assumption 1 states that S&Gs will be incorporated into and will amend existing land use plans. Our concerns regarding the plan amendment process are discussed earlier in these comments.

16-27

Assumption 2 states that this EIS will not assess the rangeland health or grazing suitability of any specific tract. We disagree. This EIS can and should disclose what is known about the ecological condition of publicly-owned lands in allotments. The EIS repeatedly states that data are available on water quality, riparian condition, upland condition, weed infestation, soil condition, etc. at least for some allotments. The supplemental DEIS should include this available information, along with the one- and three-year schedules for making management changes on priority allotments that the regulations and the Department's commitment require.

16-28

Assumption 4 states that uses other than livestock grazing will not be analyzed in this DEIS. NEPA directs that cumulative impacts be analyzed in EISs (40 CFR §§ 1508.7 and 1508.8). While it would be impossible for this DEIS to analyze alternative approaches to the management of all other uses, the DEIS should certainly disclose how grazing, recreation, OHV use, and other uses combine to impact ecosystem health.

16-29

Assumption 5 states that implementation will occur on a priority basis based on "monitoring or verified observation". However, as we have noted, no monitoring plan is included in this DEIS. How and when is this needed monitoring or verified observation to occur?

16-30

Assumption 10 states that livestock will not be removed if removal will not fix a problem. We agree that livestock should not be removed unless improvements in ecosystem health will result. However, the overwhelming majority of scientific studies indicate that the fastest way to recover rangeland health, especially in degraded riparian areas, is to allow a multi-year period of complete rest from grazing (see, e.g., Elmore and Kauffman, 1994; Clary and Webster, 1989)

Moreover, it may be impossible to accurately determine whether livestock removal will improve ecosystem health without actually removing livestock to test its effects. The alternative submitted by CNPS included a proposal for the establishment of reference areas or exclosures throughout BLM lands to test the effects of livestock removal. Many range ecologists have repeatedly made that recommendation as well (see, e.g., National Research Council, 1994). We understand that there are very few exclosures currently on BLM lands. We recommend that the supplemental DEIS include a proposal for establishment of a system of exclosures or reference areas in all plant community types on BLM lands.

List of Recommendations

For your convenience, we set out all of our recommendations immediately below:

16-31

1. The BLM should prepare a supplemental draft environmental impact statement (SDEIS) addressing the concerns raised in these and other public comments on this DEIS.

- 16-32 2. The SDEIS should evaluate real alternative approaches to grazing management including, but not limited to,
 - a. the real "no action" alternative, i.e. current, pre-Range Reform management, and
 - b. the CNPS "ecosystem management" alternative.
- 16-33 3. The SDEIS should separately display data which are derived from objective measures and subjective or "professional judgment" observations.
- 16-34 4. The SDEIS should clarify the differences among the impacts of alternatives, if any. It should include specific estimates of the amount of time that will be required under each alternative to improve the condition of various resources and allotments.
- 16-35 5. The implementation plan should be expanded and clarified to include specific timelines and triggers for action (e.g. if riparian areas are in non-functioning condition, they will be rested from livestock grazing until they attain proper functioning condition). The implementation plan should be incorporated into the alternatives and should be sufficiently clear for the public and BLM staff to understand precisely how and when the S&Gs will be translated into on-the-ground management. The implementation plan should explain how additional NEPA analysis, if any, will be included in on-the-ground implementation.
- 16-36 6. Interim guidelines and monitoring, such as those proposed by the Susanville RAC, should be implemented on all allotments where utilization limits are currently absent. These guidelines should remain in place until more comprehensive site specific S&Gs are developed.
- 16-37 7. The SDEIS should clearly explain the methods used to determine the numbers of acres and allotments that would meet standards under the various alternatives.
- 16-38 8. A monitoring plan and schedule should be added to all alternatives -- as well as incorporated in every affected land use plan along with the final S&Gs. The plan should identify the objective methods that will be used to monitor the health of different parts of the ecosystem.
- 16-39 9. The SDEIS should present a list of all allotments, grouped by Resource Area. The list should reveal:
 - a. whether the allotment meets the fundamentals of rangeland health;
 - b. whether the allotment is in compliance with the standards and guidelines under each alternative and whether it meets the fallback S&Gs;
 - c. whether objective monitoring data or only professional judgment assessment is available for the allotment regarding riparian functioning condition, water quality, ecological status, rangeland condition, etc.;
 - d. whether the allotment has been surveyed for SSPS; and
 - e. whether the allotment has an AMP.
- 16-40 10. The SDEIS should also present a management schedule for all allotments. The schedule should show:

- 16-40
cont.
- a. for allotments with known resource damage, what actions will be taken before next grazing season to address the problem;
 - b. for allotments deemed "priority allotments", what actions will be taken within the next three years to improve management; and
 - c. for allotments for which no objective monitoring data are available, a schedule showing when these allotments will be evaluated.
- 16-41
- 11. The BLM should provide the necessary information and analysis in the SDEIS to support amending affected land use plans or develop a new plan for accomplishing the needed amendments.
- 16-42
- 12. The BLM should develop a weed survey and management plan for all allotments.
- 16-43
- 13. The Bureau should install a system of exclosures to study the impacts of grazing on SSPS where impacts are unknown.
- 16-44
- 14. The SDEIS should disclose exactly what actions will be taken to mitigate grazing impacts to SSPS under the different alternatives. These actions, along with a schedule for implementation, should be incorporated into land use plans with the final S&Gs.
- 16-45
- 15. The BLM, the Regional Water Quality Control Boards, and the Water Resources Control Board should expand, strengthen and clarify the draft BMPs. Draft BMPs should be subjected to peer review and public comment. An effectiveness monitoring program and implementation schedule should be added to the Draft BMP proposal.
- 16-46
- 16. The BLM should send a letter to all affected interests in California requesting information on known grazing damage. This will provide a nearly cost-free method for the BLM to acquire valuable information on management needs.

Conclusion

16-47

NEPA directs that

"environmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made." (40 CFR §1502.2(g))

The lack of any real alternatives in this DEIS gives rise to concern that BLM had already decided on its management direction before this DEIS was released. In addition, the vague language of the alternatives, and the lack of any monitoring plan, make it almost impossible for the public to understand what that management direction will be.

We appreciate the tremendous effort that went into the preparation of this DEIS. We also appreciate the continuing commitment of the BLM to open discussions with the public about the Rangeland Reform '94 process. However, our analysis of this DEIS finds little basis for hope that the health of grazed ecosystems will be substantively and rapidly improved under these S&Gs. It would be extremely unfortunate if, after millions of tax dollars have been invested, after thousands of hours have been invested by the RACs, the public at large, and the BLM, grazing management on BLM lands is not improved.

The BLM is well aware that public trust of government agencies is not high. The public strongly supports improved grazing management on public lands (Brunson and Steel, 1994). That is why Rangeland Reform '94 was developed - because of strong political pressure from American voters and taxpayers. And that is why reform of damaging grazing management practices is eventually inevitable, because the taxpayers support it. The BLM has a tremendous opportunity to begin the inevitable process of modernizing grazing management and improving the health of grazed public lands. We make suggestions in these comments about how this goal may be accomplished. We hope that the agency will seriously consider these suggestions, and will take full advantage of the opportunities for improved range health and public trust offered by Rangeland Reform '94.

Attachments: Excerpt from Montana EIS
CNPS alternative
Soil and grazing literature review
Grazing economic data table

h:johanna/nativeplantcomments.doc

16-48, Attachment 3, pg. 10,11, soils/process
16-49, Attachment 3, pg. 14 soils/process

References

- Bronson, M. 1992. Effects of longer versus short-duration cattle grazing on winter forage available to mule deer in the northern Sierra Nevada foothills. M.S. Thesis. University of California, Davis, CA.
- Brunson, M.W. and B.S. Steel. 1994. National public attitudes toward federal rangeland management. *Rangelands* 16(2): 77-81.
- California Department of Fish and Game. 1984-1993. Annual reports of the status of California state listed threatened and endangered plants and animals. (see any year since 1984 for information on grazing threats).
- Clary, W.B. and B.F. Webster. 1989. Managing grazing of riparian areas in the Intermountain region. Gen. Tech. Rpt. INT-263. USDA Forest Service, Intermountain Research Station, Ogden, UT.
- Elmore, W. and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. In: M. Vavra, W.A. Laycock, and R.D. Pieper Eds. Ecological Implications of Livestock herbivory in the West. Society for Range Management, Denver, CO.
- Fleishner, T.L. 1994. Ecological costs of livestock razing in western North America. *Conservation Biology* 8: 629-644.
- Holecheck, J.L., R.D. Pieper and C.H. Herbel. 1995. Range Management: Principles and Practices. 2nd edition. Prentice Hall, Englewood Cliffs, NJ.
- Loft, E.R., J.W. Menke, J.G. Kie and R.C. Bertram. 1987. Influence of cattle stocking rate on the structural profile of deer hiding cover. *J. Wildlife Manage.* 51(3): 655-64.
- National Research Council, 1994. Rangeland health: new methods to classify, inventory, and monitor rangelands. National Academy Press, Washington, DC.
- Ohmart, R.D. 1996. Historical and present impacts of livestock grazing on fish and wildlife resources in western riparian habitats. In: P.R. Krausman (ed). Rangeland Wildlife. Society for Range Management, Denver.
- Skinner, M.W. and B. Pavlik. 1994. Inventory of Rare and Endangered Vascular Plants of California. 5th edition. California Native Plant Society, Sacramento, CA.
- U.S. General Accounting Office. 1992. Rangeland Management - Interior's Monitoring Has Fallen Short of Agency Requirements. GAO/RCED-92-51.
- Willoughby, J., E. Hastey, K. Berg. P. Ditterner, R. Fellows, R. Holmes, J. Knight, B. Radtkey, and R. Rosentreter. 1992. Rare plants and natural plant communities: a strategy for the future. Fish and Wildlife 2000 series. BLM-CA-PT-92-018-6850. U.S. Department of the Interior Bureau of Land Management, Sacramento, CA.



United States Department of the Interior
Bureau of Land Management

DRAFT

Montana State Office

October 1996



STANDARDS for Rangeland Health and GUIDELINES for Livestock Grazing Management Environmental Impact Statement

OCT - 4 1996



CHAPTER 2

DESCRIPTION OF ALTERNATIVES

Three alternatives were considered in detail and are documented in this chapter:

Alternative 1 - No Action: for purposes of this analysis, the no action alternative is defined as a continuation of current management direction:

Alternative 2 - The Proposed Action: the proposed action consists of the proposed regional S&Gs developed by BLM, in consultation with affected resource advisory councils (RACs), as required by regulations at 43 CFR 4180.2(a) and (b);

Alternative 3 - Fallback S&Gs: The fallback S&Gs, found in the regulations at 43 CFR 4180.2(f), will be used in the event regional S&Gs are not completed and in effect by February 12, 1997.

The proposed action and the fallback S&Gs address the purpose and need described in Chapter 1 by fulfilling the requirements of the new grazing regulations (43 CFR 4180). The no action alternative does not fully address the purpose and need, but provides a benchmark against which to evaluate the other alternatives.

GUIDANCE COMMON TO ALL ALTERNATIVES

The following management guidance applies to each of the alternatives studied in detail.

Threatened, Endangered, and Sensitive Species Habitat

No activities will be permitted in habitat for threatened and endangered species that would jeopardize the continued existence of such species. The U.S. Fish and Wildlife Service (USFWS) will be consulted prior to implementing projects that may affect habitat for threatened and endangered species.

Habitats for threatened and endangered species will be managed for recovery and protection. Recovery plans and other appropriate guidance will be developed and implemented, including the Interagency Grizzly Bear Guidelines (Appendix B), the Montana Bald Eagle Management Plan, the Montana Fluvial Arctic Grayling Restoration Plan, the Montana Prairie Dog Management Guidelines, and management guidelines for Yellowstone and westslope cut-throat trout habitat.

Noxious Weed Management

The highest priority will be placed on preventing the spread of noxious weeds into weed-free areas, particularly areas with high to moderate ecological risk from weed invasions. BLM activities and authorizations will be reviewed and modified where necessary to minimize the spread of noxious weeds. Where noxious weeds are established, priority will be given to the use of effective, nonchemical methods of weed control, when and where feasible. Herbicides will generally be used only after considering the effectiveness of all potential methods, or in combination with other methods or controls.

Cultural Resources

Proposed range improvements and other activities on federal land are subject to Section 106 of the National Historic Preservation Act (NHPA), which requires that agencies consider the effects of federal undertakings on cultural resources through a step-by-step process. If conflicts are anticipated between a proposed activity and an historic property, an effort will be made to avoid the property through project redesign or cancellation. If a project cannot be redesigned and it has great merit, an effort will be made to mitigate the effect of the project on the property.

Where BLM activities may impact areas of cultural or religious importance to Native Americans, the BLM will consult with those groups under the American Indian Religious Freedom Act (AIRFA), the Religious Freedom Restoration Act (RFRA), and the NHPA, if appropriate, to ensure that impacts to these groups are minimized.

ALTERNATIVE 1 - NO ACTION (CONTINUATION OF CURRENT MANAGEMENT)

Livestock grazing management on BLM-administered lands within the EIS area is presently subject to decisions documented in eight RMPs and one MFP. These include the Big Dry RMP, Billings RMP, Dillon MFP, Headwaters RMP, Judith-Valley-Phillips RMP, North Dakota RMP, Powder River RMP, South Dakota RMP, and West HiLine RMP.

In addition, many existing land use plans incorporate decisions resulting from previous grazing EISs, including the

Mountain Foothills, Missouri Breaks, Prairie Potholes, Big Dry, and North Dakota Grazing EISs.

These land use plans and grazing EISs were prepared over a period of 18 years (1979-1996) and cover a wide geographic area. Each plan reflects grazing-related policies and practices that were in effect at the time it was prepared. Grazing-related decisions in existing land use plans are prioritized annually for implementation. The rate of implementation depends on funding, staffing, and competing priorities.

Current management direction is summarized below. Detailed descriptions of current management direction are contained in the MFP, RMPs, and grazing EISs listed above. A complete set of plans and EISs is available for review at the BLM Montana State Office; individual land use plans are also available for review at affected field offices.

Water Quality

Surface and groundwater quality will be maintained to meet or exceed applicable state and/or federal water quality standards. Vegetative cover objectives will be established on key upland, riparian, and wetland sites with a goal of reducing runoff and sedimentation, especially in areas with highly erodible soils.

Allotment Categorization

All livestock grazing allotments are assigned to one of three management categories based on present resource conditions, values, and the potential for improvement. The purpose of allotment categorization is to assure that management is focused on high priority allotments.

Category "I" (Improvement) allotments generally have moderate to high resource production potential, but are producing at low to moderate levels. Present range condition generally is unsatisfactory, and substantial resource use conflicts or controversy often exist. Opportunities for positive economic return from public investments are available. Opportunities also are available to achieve the allotment's potential through changes in management. Management objectives established in land use plans generally are not being met. Improvement allotments generally are high priority for monitoring and for changes in grazing management.

At the present time, there are 774 allotments in this category within the EIS area. Total public land acreage in these allotments is approximately 3.8 million acres.

Category "M" (Maintenance) allotments generally have moderate to high resource production potential and are producing near their potential. Present range condition generally is satisfactory, and resource use conflicts and controversy are minor or absent. Opportunities for positive economic return from public investments may or may not be available. Management objectives established in land use plans generally are being met. Maintenance allotments generally are moderate priority for monitoring and for changes in grazing management.

At the present time, there are 1489 allotments in this category within the MT/DAKs. Total public land acreage in these allotments is approximately 3.4 million acres.

Category "C" (Custodial) allotments generally have low resource production potential and are producing near their potential. Present range condition varies, and minor resource use conflicts or controversy may exist. Opportunities for positive economic return from public investments generally are limited or are not available. In the MT/DAKs, most custodial allotments consist of small, isolated tracts of public land surrounded by private land. Many are considered high priority for disposal through exchange. Custodial allotments generally are low priority for monitoring and for changes in grazing management.

At the present time, there are 2727 allotments in this category within the MT/DAKs. Total public land acreage in these allotments is approximately 1.0 million acres.

Approximately 0.1 million acres in 250 allotments have not been placed in either of the above management categories. These are typically small, isolated, ungrazed tracts.

Allotments are periodically reviewed and may be re-assigned to a different category based on monitoring and evaluation of resource conditions.

Management Objectives

General management objectives are established and documented in the existing MFP and RMPs listed above. Such objectives affect allotment management as well as all other resource uses and values. General management objectives for the EIS area typically include the following:

- Maintain and/or improve soil productivity by increasing vegetation cover and reducing erosion.
- Improve or maintain the ecological status of rangeland vegetation: good or excellent ecological condition is the goal.

DRAFT - 10/96

BLM Ecosystem Management Alternative - proposal

Summary

This alternative is based on the idea that of grazing management should be determined by the health of the ecosystem. The goal is to develop grazing management systems that protect the health of all resources on BLM lands in California. The alternative proposes some starting points for improved management, including grazing suitability analysis and improved monitoring. The alternative then allows monitoring results to set the amount of grazing that is allowed and the season during which grazing takes place. This approach is designed to ensure that grazing management is progressively adjusted until resources are in healthy condition.

This alternative proposes that four things shall occur in a timely manner on BLM lands in California.

1. Grazing-damaged and grazing-sensitive areas are identified
2. Science-based and quantitative ecological standards and management guidelines are developed and implemented
3. Science-based monitoring plans are developed and implemented
4. Grazing management is changed to protect resources where necessary

The first step in implementing the Alternative will be to identify grazing damaged and grazing sensitive areas within each allotment within one year. This evaluation should be accompanied by an evaluation of which grazing-damaged or grazing-sensitive areas can support grazing with careful monitoring and management, and which areas must be excluded from grazing.

The second step will be to develop monitoring plans and standards for all grazing-damaged and grazing-sensitive areas within one year.

The third step will be to adjust management where necessary using Guidelines. Where standards are not being met, and it is determined that grazing is causing or contributing to resources damage, reductions in stocking rate, allowable utilization, changes in seasons of use, or some combination will be implemented before the following season. If monitoring shows that resource condition does not improve after two years of adjusted management, then grazing management should be further adjusted.

The description of the Alternative is divided into three parts:

1. The first section describes the procedures for implementing the Alternative. This section describes the steps that should be taken to develop Ecological Indicators and Standards. It describes the timeline for taking those steps.
2. The second section gives examples of indicators of ecological condition and of standards for management. This section is not meant to be exhaustive. It is

meant to present a menu of ecological indicators and management standards from which site-specific indicators and standards may be selected. This menu may be augmented by information from the scientific literature, from agency handbooks, and other sources.

3. The third section presents management Guidelines. These describe how utilization and/or season of use should be adjusted when Standards are not being met.

Procedures for implementing the Alternative

A. Reference areas

Representative ungrazed vegetation reference plots should be placed or identified in appropriate areas to demonstrate the potential ungrazed soil and vegetation conditions and species composition (potential natural condition or undisturbed condition). Information on potential ungrazed ecological structure and species composition may also be gathered by investigating similar plant communities in National Parks or other protected areas, by consulting key researchers, and by inspecting historical records from the last century (Grumbine, 1994; Manley et al., 1995; Bock et al., 1991).

B. Grazing-sensitive areas

Some plant communities cannot support livestock without permanent damage or irreversible loss of resources or ecological services.

Examples of areas that are particularly susceptible to grazing damage include (a) desert ecosystems (b) high elevation mountain meadows (c) riparian areas, including ephemeral streams and seeps (d) rare species habitat.

1. Evaluations of which allotments and which areas within allotments cannot sustainably be grazed will be made by an interdisciplinary team within 1 year. Grazing will be excluded from these areas. Criteria for suitability will include low productivity, fragility of vegetation or soils, conflicts with other uses (e.g. recreation, water use by communities, etc.), or exorbitant costs of protecting other resources.

This type of suitability analysis is already mandated on National Forests by the National Forest Management Act (36CFR§ 219.3). According to the NFMA, suitability is defined.

"The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone."

2. An interdisciplinary team (see below) will also determine which areas within allotments are sensitive to grazing damage but still may be sustainably grazed with careful management and monitoring. Grazing-sensitive areas will be given priority for development of monitoring plans, and standards and guidelines (see below).

C. Grazing-damaged areas

1. Each allotment will be surveyed for resource damage
2. An evaluation will be made by an interdisciplinary team within one year of where grazing is contributing to resource damage.
3. The team will also determine whether the damage can be reversed with careful monitoring and management of grazing or whether the area should be excluded from grazing.
4. If the team determines that grazing can continue, then the damaged area will be given priority for development of monitoring plans and standards and guidelines (see below).

D. Ecological indicators

1. Measurable indicators of ecosystem health (Interagency Ecosystem Management Task Force, 1995; Ecological Society of America, 1995; Williams and Marcot, 1991) will be identified by an interdisciplinary team within 1 year for grazing-damaged and grazing-sensitive habitats. Ecological indicators may be defined on the allotment, watershed, Resource Area, or larger scale as appropriate.

Indicators should include, as appropriate, measures of riparian structure and function, frequency of disturbance-following non native species, soil quality, rare species vigor, wildlife habitat quality, and water quality (see examples below).

2. Indicators will be used to define standards which will trigger management changes if they are not met. Indicators will also define desired conditions. Standards are values of ecological indicators which indicate that the ecosystem is healthy and is at or measurably moving towards desired condition.
3. Ecological indicators, standards, and desired conditions for general allotment health should be developed within 3 years.

E. Standards

Standards are specific values of ecological indicators for each individual resource (soil, water, riparian zone, wildlife, vegetation, etc.). Standards are values of ecological indicators which indicate that the ecosystem is healthy and is at or measurably moving towards desired condition. Standards are also those values of ecological indicators which show that an ecological threshold is being approached. For example, when an ecological indicator shows that the ecosystem is "at risk" (National Research Council, 1994) or "functioning at risk" (BLM, 1995; California Rivers Assessment, 1996), the ecosystem is at a threshold.

Once a threshold, such as loss of the A horizon, has been crossed, it becomes much more difficult, even impossible, to restore the ecosystem to its previous state. It is not adequate to wait until a threshold is reached or crossed to alter management, because by then restoration may be

impossible (Milton et al., 1994). Standards, therefore, should be set well on the healthy side of thresholds. Failure to meet any standard should trigger immediate management changes.

Management that meets or exceeds standards should measurably and substantively move the ecosystem towards the desired condition.

1. Within 1 year, standards shall be defined for each indicator for grazing sensitive and grazing-damaged areas. Standards shall be defined for general allotment health within 3 years. See examples of ecological indicators and standards below.
2. Qualitative vs. quantitative standards
Standards may be qualitative (subjective), but should be quantitative (objective) where possible. Qualitative measures should be used for routine annual monitoring only if quantitative measure is demonstrated to be unfeasible.

If a qualitative standard, such as the BLM's definition of "proper functioning condition" for riparian areas (California Rivers Assessment, 1996; BLM, 1995), is used for routine annual monitoring, it shall be supplemented by quantitative standards which will be measured periodically (minimum of every 3 years) to verify and calibrate monitoring results for the standard. Quantitative standards will also be used for more detailed site examinations if qualitative measurements show that a problem exists.

3. Photographs
Annual photographs should be used to document progress towards standards. Photographs should be carefully standardized following an accepted published protocol (e.g. EPA, 1993; Kinney and Clary, 1994).
4. If a standard is not being met, then management will be adjusted before the following grazing season (see Guidelines below).

F. Desired condition

The desired condition is the target range of values for each ecological indicator. The desired condition is the goal towards which management should be moving the ecosystem.

Quantitative desired conditions should be defined for each indicator based on the potential natural condition (undisturbed) of that indicator. Information on potential natural condition can be gathered from reference areas, from experts, or from the scientific literature.

G. Monitoring

1. Science-based monitoring protocols for utilization and ecological indicators will be developed by an interdisciplinary team within one year.
2. Utilization, season of use, and ecological indicators will be monitored each year to determine if standards are being met.

3. Quantitative vs. qualitative monitoring

Annual monitoring for ecological indicators should be quantitative where possible. Qualitative measures should be used for routine annual monitoring only if quantitative measure is demonstrated to be unfeasible.

If a qualitative method, such as the BLM's definition of "proper functioning condition" for riparian areas (California Rivers Assessment, 1996; BLM, 1995), is used for annual monitoring of ecological condition, it shall be supplemented by quantitative methods which will be measured periodically (minimum of every 3 years) to verify and calibrate results. Quantitative methods will also be used for more detailed site examinations if qualitative measurements show that a problem exists.

4. Annual photographs should be used to document ecological condition of key areas, sensitive areas, and damaged areas. Photographs should be carefully standardized following an accepted published protocol (e.g. EPA, 1993; Kinney and Clary, 1994).

5. If monitoring is not performed in any year, then grazing management will be adjusted the following grazing season. Adjustments should include

- a. reductions in allowable utilization by a minimum of 10% for each year monitoring is not performed, OR
- b. reductions in season of use by a minimum of 10% for each year monitoring is not performed, OR
- c. a combination of changes in season of use and utilization.

(Alternatively, grazing use may be suspended altogether until monitoring is performed. This approach would avoid any problems with a 10% reduction being perceived as arbitrary or capricious. The point is to provide a positive incentive to both the agency and to permittees to ensure that monitoring is performed.)

When monitoring is resumed, and if monitoring shows that standards are being met or exceeded, then management adjustments will be reversed.

H Interdisciplinary team

Management adjustments, suitability determinations, monitoring protocols, and ecological indicator selection will be designed and carried out by an interdisciplinary team including specialists in range management, botany, plant ecology, soil science, ecosystem science, fisheries, hydrology, wildlife, and other disciplines as appropriate.

I. Permits

Monitoring plans, standards and guidelines will be incorporated into each grazing permit immediately upon completion. Grazing permits, Allotment Management Plans and Range Management Decisions shall state

- o what indicators will be used to determine whether standards are being met
- o how, when, where and by whom the indicators will be measured
- o what records will be kept of the monitoring results and when and where will they be available

- o what actions (management, enforcement) will be taken if standards are not being met after a specified time period (usually 2 years).

J. Scientific and public review

Ecological indicators, monitoring protocols, standards and desired future condition definitions will be reviewed by specialists from agencies, universities, or other appropriate institutions for scientific and biological soundness following the peer review process. The specialists will represent a range of disciplines including soil science, botany, fisheries, hydrology, range management, wildlife ecology, and plant ecology.

The indicators, monitoring protocols, and standards shall also be reviewed by the public.

Examples of indicators and standards:

Ecological indicators are measures of the health of the resources that make up an ecosystem.

Standards are specific values or descriptions of indicators which, if not exhibited in the field, will trigger immediate changes in management to improve ecosystem health. Standards should be set so that where standards are being met or exceeded, the ecosystem should be measurably moving towards desired condition.

This section presents some examples of possible indicators and standards. The list is not meant to be exhaustive. It is meant to act as a guide to the interdisciplinary teams who will be developing the actual site specific indicators and standards.

Site specific indicators and standards will be developed on the allotment, resource area, watershed, or other appropriate scale.

Indicators and standards may be qualitative, but should be quantitative where possible. Qualitative measures should be used for routine annual monitoring only if quantitative measure is demonstrated to be unfeasible.

If a qualitative method, such as the BLM's definition of "proper functioning condition" for riparian areas (California Rivers Assessment, 1996; BLM, 1995), is used for routine annual monitoring, it shall be supplemented by quantitative measurements which will be measured periodically (minimum of every 3 years) to verify and calibrate monitoring results. Quantitative standards will also be used for more detailed site examinations if qualitative measurements show that a problem exists.

Annual photographs should be used to document progress towards standards. Photographs should be carefully standardized following an accepted published protocol (e.g. EPA, 1993; Kinney and Clary, 1994).

General

Indicator: Rangeland Health Evaluation Matrix (National Research Council, 1994). NOTE: This addresses the specific aspects of ecosystem health that are required by the Rangeland Reform '94 regulations.

Standard: Rangeland health indicators will be in healthy condition.

Indicator	Healthy	At Risk	Unhealthy
<u>Soil stability and watershed function</u>			
Soil A horizon	Present and unfragmented	Present but fragmented distribution developing	Absent or present only in association with prominent plants or other obstructions.
Pedestalling	None	Pedestals present, but on mature plants only; no roots exposed	Most plants and rocks pedestaled, roots exposed
Rills and gullies	Absent or with blunted or muted features	Small, embryonic, and not connected into a dendritic pattern	Well defined, actively expanding, dendritic pattern established
Scouring or sheet erosion	None visible	Patches of bare soil or scours developing	Bare areas and scours well developed and contiguous
Sedimentation or dunes	No visible soil deposition	Soil accumulating around plants or small obstructions	Soil accumulating in large barren deposits or dunes or behind large obstructions
<u>Distribution of nutrient cycling and energy flow</u>			
Distribution of plants	Plants well distributed across site	Plant distribution becoming fragmented	Plants clumped, often in association with prominent individuals, large bare areas between clumps.
Litter distribution and incorporation	Uniform across site	Becoming associated with prominent plants or other obstructions	Litter largely absent
Root distribution	Community structure results in rooting throughout available soil profile	Roots are absent from portions of the available soil profile	Roots only present in one portion of the available soil profile
Distribution of photosynthesis	Photosynthetic activity occurs throughout the period suitable for plant growth	Most photosynthetic activity occurs during one portion of plant growth period	Little or no photosynthetic activity on location during most of the period suitable for plant growth

Recovery mechanisms

Age-class distribution	Distribution reflects all species and age classes	Seedlings and young plants missing	Primarily old or deteriorating plants present
Plant Vigor	Plants display normal growth form	Plants developing abnormal growth form	Most plants in abnormal growth form
Germination	Microsites suitable for germination present and well distributed	Developing crusts, soil movement, or other factors degrading microsites; crusts are fragile	Soil movement of crusting sufficient to inhibit most germination and seedling establishment

Soils

- o Indicator: stability of soil surface aggregates compared to ungrazed or undisturbed site.
Standard: Soil surface aggregate stability should be equivalent to similar ungrazed sites.
- o Indicator: % cover by bare soil
Standard: bare soil should cover less than 5% of key areas (see utilization guidelines below for definition of key area).
- o Indicator: Rooting Depth
Standard: Depth to common roots. This is the depth at which root density is found to meet the definition of "common" of the Natural Resources Conservation Service (personal commun., Desi Zamudio, Soil Scientists, Toiyabe NF Sparks, NV). This depth should be equivalent for grazed sites and reference areas.

Riparian

- o Indicator: Streambank stability
Standard: Streambank trampling by livestock should not exceed 5% at any time.
- o Indicator: bank vegetation cover
Standard: native vegetation cover ³ 95%
- o Indicator: Rosgen channel characteristics (Rosgen, 1985)
Standard: Stream channels should conform to the characteristics (width:depth, sediment load, etc.) of the potential (undisturbed) Rosgen channel type.
- o Indicator: Other riparian characteristics
Standard: Bank angle (e.g., ² 90° for ³ 80% of stream reach), bank stability, percent overhanging banks (e.g., overhanging banks should be present where appropriate) (US Environmental Protection Agency, 1993).
- o Indicator: Riparian condition
Standard: Stream channels should be in proper functioning condition (BLM, 1995; California Rivers Assessment, 1995)

Plant community

- o Indicator: plant community demography
Standard: % cover, proportion of native species, distribution of seral stages and age classes should be equivalent to ungrazed reference sites.
- o Indicator: species composition
Standard: native indicator species (e.g. Menke, 1996) which reflect ecosystem health, should be used to compare condition of grazed and ungrazed reference sites.
- o Indicator: non-native species cover, particularly of disturbance-following species.
Standard: disturbance-following non-native species will make up less than 5% of plant species frequency at the soil level.

Rare species

- o Indicators of the health and vigor of rare species populations include numbers, area covered by populations, recruitment, vigor. Standards must be set for each species individually and should ensure the recovery of threatened and endangered species and prevent future listings.

Water quality

- o Indicators: Water quality indicators will include specific limits for temperature, sediment, nutrient (N and P) and fecal coliform following the direction of the Regional Water Quality Control Board Basin Management Plans.
Standard: Surface and ground water must meet Regional water quality standards.

Guidelines

A. General guidelines for adjusting grazing management to protect resources

1. If monitoring data indicates that the condition any resource is not meeting ecological standards (see examples above), and if there is evidence that grazing impacts are causing or contributing to this unsatisfactory condition, then grazing management will be adjusted before the following grazing season.

Adjustments shall be determined by an interdisciplinary team including specialists with relevant expertise. Adjustments shall be designed to show rapid, substantive and measurable progress towards desired conditions.

Adjustments should include but need not be limited to:

- a. reductions in season of use by a minimum of 20% in the affected area. Season of use changes should be designed to improve ecological condition, OR
- b. reductions in allowed utilization by a minimum of 20% in the affected area, OR
- c. a combination of changes in season of use and utilization.

2. If after two years of altered management, resource condition still does not meet standards, and if there is evidence that the problem continues to be related to grazing impacts, then management will be further adjusted as in (1) above.

B. Additional Guidelines for specific resources

Livestock management

- o Utilization, streambank trampling and compliance with mandated on- and off-dates shall be monitored every year. If these guidelines are not met willfully or due to repeated negligence, then enforcement action will be taken.

Riparian

- o If streambank trampling by livestock exceeds 5% at any time, then an evaluation will be made immediately by a hydrologist and fisheries biologist to determine the ability of the riparian area to capture sediment, maintain water quality, and dissipate flood energy. If the riparian area does not meet any single ecological standard, and if it is determined that the problem is being caused or contributed to by livestock, then management will be adjusted as in (A) until the area meets ecological standards.
- o A functioning condition assessment (BLM, 1995; California Rivers Assessment, 1996) will be done within 1 year. If a riparian area is found to be functioning "at risk", and if it is determined that the problem is being caused or contributed to by livestock, then management will be adjusted as in (A) above until the area is functioning properly.
- o If a "no" answer is given to any question in the proper functioning condition checklist (BLM, 1995; California Rivers Assessment, 1996), then a quantitative measurement of that riparian attribute should be made immediately. If it is determined that the problem is being caused or contributed to by livestock, then management will be adjusted as in (A) above.
- o If a riparian area is in nonfunctional condition due to livestock grazing (BLM, 1995; California Rivers Assessment, 1996), then grazing will be excluded from the area until it reaches proper functioning condition.

Range Health

- o A range health assessment (see Rangeland Health Evaluation Matrix, above) (National Research council, 1994) will be done within 1 year for damaged areas and grazing-sensitive areas, and within 3 years for general allotment health. If any indicator is found to be in "at risk" condition, and if livestock grazing is contributing to the problem, then management will be adjusted as in (A) above.
- o If any indicator is in "unhealthy" condition due to livestock grazing, then grazing will be excluded from the area until it reaches healthy condition.

Utilization

Forage utilization shall be monitored each year. If ecological standards are not met in any year then management will be adjusted as in (A) above before the following grazing season.

Key areas for utilization monitoring should be set for each allotment (USDA Forest Service, 1993). The areas of maximum use are the key areas and it is use in these areas that should determine when utilization limits for each allotment or pasture have been reached. Utilization mapping may be used to help establish use patterns and determine areas of maximum use.

Where no utilization limits exist and standards are not being met, initial utilization limits will be set by plant community type and adjusted through adaptive management as monitoring results warrant.

Clary and Webster (1989) recommend 4-6 inch minimum stubble height remain at the end of the grazing season in most healthy riparian areas. They recommended setting minimum stubble heights greater than six inches for critical fisheries, easily eroded streambanks, or unhealthy riparian areas (such as those not meeting standards, or those "functioning at risk"). They also note that degraded riparian areas (such as those in nonfunctional condition) should be rested.

Holecheck and coworkers presented some moderate utilization limits that may also provide starting points for management. For rangelands not meeting standards, the lower of the range of utilization limits should be used.

Utilization recommendations from Holecheck et al., 1995 (p. 195-198).

These recommendations are for "moderate" utilization of key herbaceous species in rangelands in "moderate" ecological condition. Lower utilization limits are recommended for poorer condition rangelands.

Community type	Percent use of key herbaceous species
Semi-desert grass and shrubland	30-40
Sagebrush grassland	30-40
Calif. annual grassland	50-60
Coniferous forest	30-40
Mountain shrubland	30-40
Oak woodland	30-40
Pinon-juniper woodland	30-40
Alpine tundra	20-30

Note: % utilization can be converted to approximate minimum allowed stubble heights or residual dry matter by using average values for height and dry weight of key species (see Kinney and Clary, 1994 or Clary and Webster, 1989 for example).

Season of use

Grazing season should be based on ecosystem processes. On-date should be determined by soil (e.g. soil should be dry enough to resist deformation by livestock) and plant phenology (e.g. growth should be adequate to provide for seed set and carbohydrate storage before grazing begins). Off-date should be set to prevent the dietary "switch" from herbaceous to woody vegetation (Bronson, 1992; Elmore and Kauffman, 1994; Clary and Webster, 1989; Loft et al., 1987). Additional consideration should be given to bird nesting season and wildlife use of site, such as for fawning cover, in setting season of use.

Season of use will be adjusted if an interdisciplinary team determines that failure to meet standards is related to grazing season. For example, if soil compaction is occurring due to early season grazing in wet soils, then on-dates will be adjusted so that livestock do not enter the area until the soil is dry.

Woody species

Allowed utilization for woody species should be incidental use or <5% of annual leader growth. Woody species are not part of the forage base. Woody species generally are not used by cattle until available herbaceous forage has been consumed, dried to unpalatability, or has otherwise become unavailable (Bronson, 1992; Elmore and Kauffman, 1994; Clary and Webster, 1989; Loft et al., 1987). Because browsing occurs after other forage sources are exhausted, overuse and severe damage of browse species (willows, oaks, shrubs, etc.) can occur very rapidly after browsing has commenced.

Rare species

Grazing management will ensure the recovery of threatened and endangered species and will prevent future listings.

If a rare or sensitive species is present, but inadequate information is available on grazing impacts, species, a multi-year scientifically sound (peer reviewed) monitoring and evaluation program (conservation strategy) will be developed and initiated immediately. Possible mitigations will also be developed and will be included, on a conditional basis, in the management plan (AMP, Land Use Plan, Resource Area Plan).

If after an appropriate monitoring period (1-4 years), grazing is found to be detrimental to the species OR if monitoring is not performed, then mitigations will be implemented. Conditional mitigations to be considered will include (1) adjusting season of use, (2) increases in minimum allowed stubble height (reductions in allowed use) in sensitive plant habitat, or (3) closing affected pastures to grazing.

Where an approved ecosystem management plan, habitat management plan, recovery plan, conservation strategy or other management plan exists for one

or more rare species, an evaluation and report will be made of whether the plan is being implemented and monitored.

Noxious weeds

Populations and trends of noxious weeds and other invasive non native plants and animals shall be monitored each year.

Specific actions will be built into standards and guidelines and management plans to discourage the spread and infestation of weeds (e.g. use of weed free hay, livestock purging periods) (Sheley, 1995). Weed infestations ^a 2% plant cover will trigger implementation of weed control measures.

Restoration

Only locally-collected native species will be used for restoration projects.

Water quality

Grazing management practices should ensure the attainment of water quality which is necessary to meet or exceed State and Federal standards. Water quality indices shall be monitored and reported annually. Adjustments in stocking rate and/or season of use will be made the following season if standards are not met in any year.

Opportunistic management

Opportunistic management will be employed. After exceptionally wet or dry years, or following fire, flood or other extraordinary events, livestock grazing may be reduced or eliminated in order to avoid interfering with recruitment of species which germinate or sprout in response to events such as fire, or are unusually sensitive to damage following events such as flood or drought. Temporary (1-3 year) changes in management, including rest, should be evaluated by an interdisciplinary team following fire, flood, etc.

References

- Bock, C.E., Bock, J.H. and H.M. Smith. 1993. Proposal for a system of federal livestock exclosures on public rangelands in the western United States. *Conservation Biology* 7(3): 731-3.
- Bronson, M. 1992. Effects of longer versus short-duration cattle grazing on winter forage available to mule deer in the northern Sierra Nevada foothills. M.S. Thesis. University of California, Davis, CA.
- Bureau of Land Management. 1995. Riparian area management. Process for assessing proper functioning condition. TR 1737-9 1993. USDI Bureau of Land Management, Denver, CO.
- California Rivers Assessment. 1996. Professional Judgment Assessment of Riparian Condition. Information Center for the Environment, University of California, Davis, CA.
- Clary, W.B. and B.F. Webster. 1989. Managing grazing of riparian areas in the Intermountain region. Gen. Tech. Rpt. INT-263. USDA Forest Service, Intermountain Research Station, Ogden, UT.
- Ecological Society of America. 1995. The scientific basis for ecosystem management. Ecological Society of America, Washington, DC.
- Elmore, W. and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. In: M. Vavra, W.A. Laycock and R.D. Pieper eds., Ecological Implications of Livestock Herbivory in the West. Society for Range Management, Denver, CO.
- Environmental Protection Agency. 1993. Monitoring protocols to evaluate water quality effects of grazing management on western rangeland streams. EPA 910/R-93-017. U.S. Environmental Protection Agency, Seattle, WA.
- Grumbine, R.E. 1994. What is Ecosystem Management? *Conservation Biology* 8(1): 27-38.
- Holecheck, J.L., R.D. Pieper and C.H. Herbel. 1995. Range Management: Principles and Practices. 2nd edition. Prentice Hall, Englewood Cliffs, NJ.
- Interagency Ecosystem Management Task Force. 1995. The ecosystem approach: healthy ecosystems and sustainable economies. Vol. I. Council on Environmental Quality, Washington, DC.
- Kinney, J.W. and W.P. Clary. 1994. A photographic utilization guide for key riparian graminoids. Gen. Tech. Rpt. INT-GTR-308. USDA Forest Service, Intermountain Research Station, Ogden, UT.
- Loft, E.R., J.W. Menke, J.G. Kie and R.C. Bertram. 1987. Influence of cattle stocking rate on the structural profile of deer hiding cover. *J. Wildlife Manage.* 51(3): 655-64.

- Manley, P.N. and others. 1995. Sustaining ecosystems: a conceptual framework. Version 1.0. USDA Forest Service Pacific Southwest Region, San Francisco, CA.
- Menke, J.W., C. Davis, and P. Beesley. 1996. Rangeland Assessment. In: Sierra Nevada Ecosystem Project: Final report to Congress, Vo.. III. Centers for Water and Wildland Resources, University of California, Davis.
- Milton, S.J., W.R.J. Dean, M.A. du Plessis, and W.R. Siegfried. 1994. A conceptual model of arid rangeland degradation. *BioScience* 44(2): 70-75.
- National Research Council, 1994. Rangeland health: new methods to classify, inventory, and monitor rangelands. National Academy Press, Washington, DC.
- Rosgen, D.L. 1985 A stream classification system. In: Johnson, R.R. et al., eds. Riparian ecosystems and their management: reconciling conflicting uses. 1st North American riparian conference. Gen. Tech. Rpt. GTR-RM-120. USDA Forest Service Rocky Mountain Forest and Range Experiment Station.
- Sheley, R. 1995. Integrated rangeland weed management. *Rangelands* 17(6): 222-3.
- Williams, B.L. and B.G. Marcot. 1991. Use of biodiversity indicators for analyzing and managing forest landscapes. *Trans. North American Wildlife and Natural Resources Conf.* 56: 613-27.

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**Impacts of Livestock Grazing on Soils
and
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"The most important and most basic physical resource on rangelands is the soil. If excessive soil is lost, the potential of the site is changed." "Avoidance of accelerated erosion due to land management should be the underlying goal."

Society for Range Management, 1995.

"There is very little of the western range where, because of depletion of the plant cover by overgrazing, accelerated erosion has not destroyed a portion of the soil mantle and thus reduced the productivity of the site."

Ellison, 1960

Impacts of Grazing on Soils

Livestock grazing profoundly affects soils, as it affects other components of ecosystems. The impacts of livestock on soils have been studied throughout the West since the turn of the century. Livestock have been found to significantly alter almost every aspect of soil structure and function, including soil porosity, chemistry, microbiology, nutrient cycles, productivity, and erosion rates. Most studies have shown that livestock grazing increases soil compaction, erosion, and short-term nutrient availability, while it tends to reduce long-term soil nutrient and organic matter levels.

Soil structure: infiltration and compaction

Soil structure is basic to soil health and productivity. Soil structure is the arrangement of particles within the soil (Brady, 1984). Soil structure is an integrated description which includes soil porosity and the size and strength of soil aggregates. Soil structure controls the movement of air, water, roots and soil organisms into and through the soil. Structure is also the soil attribute most immediately affected by grazing. Grazing changes soil structure primarily by compaction. Compaction reduces water and air infiltration into the soil and restricts plant root growth both physically, by reducing the space available for root exploration (Tisdale et al., 1985), and biologically. In California, for example, studies have shown that low oxygen availability associated with soil compaction inhibits oak root growth, makes oaks more vulnerable to attack by fungal and other pathogens, and reduces oak survival (Costello et al., 1991). Similar responses have been observed for many other plant species in compacted soils (Tisdale et al., 1985). Finally, more water runs off and less water is absorbed when soils are compacted. This reduces water availability to plants throughout the growing season.

Cattle weigh 500 kg (1,100 lb) or more (Holecheck et al., 1995). The pressure on soil from moving cattle has been estimated by various researchers at between 1.7 and 4.2 kg/cm² (23.9 - 59.05 lb/in²). By contrast a 68 kg (159lb) human exerts a static pressure of 0.4 kg/cm² (6.2 lb/in²) (Abdel-Magid et al., 1987b; Ratliff, 1985). This intense and continual pressure from moving livestock easily compacts soil, particularly when the soil is wet and most vulnerable to compaction (Brady, 1984; Warren, 1987).

Studies on grazing and soil compaction generally find that exposure to livestock grazing compacts soil and that soil compaction increases with grazing intensity. This pattern is reflected in reviews of the scientific literature on the subject (Fleischner, 1994; Lauenroth et al., 1994; Kauffman and Krueger, 1984; Warren, 1987; Belsky and Blumenthal, 1995). Compaction is directly related to soil productivity because it reduces water and air movement into and through the soil and therefore reduces water and air availability to plant roots. Soil compaction also directly restricts root growth because compacted soils have fewer large pores and so there is little space for roots to enter (Tisdale et al., 1985).

Infiltration rate is the rate at which water enters the soil, as opposed to puddling or running off. Infiltration rate is often used as a measure of soil compaction. Heavy grazing has been shown to decrease infiltration in a number of soil types and geographic areas throughout the west, including northeastern Colorado (Rauzi and Smith, 1973), Wyoming (Abdel-Magid et al., 1987a,b), Texas (Pluhar et al., 1987; Warren et al., 1986), and Oregon (Bohn and Buckhouse, 1985). Abdel-Magid and coworkers (1987b), for example, found a 40% decrease in infiltration rate under simulated trampling, and this effect was observed whether the trampling was of short or long duration.

Soil bulk density is a more direct measure of soil compaction. A few studies have found no relationship between livestock stocking rate and bulk density (Warren et al., 1986c). Most studies, however, have found significant increases in bulk density (soil compaction) with grazing, particularly in finer textured soils and in surface soil layers (Abdel-Magid et al., 1987b; Orr, 1960; Bauer et al., 1987; Warren et al., 1986b; Firestone, 1995; Ellison, 1960). This effect is most pronounced with heavy grazing, but is also observed with moderate intensity grazing. Firestone (1995) observed a 13% increase in bulk density of grazed soils under oaks in California. Orr (1960) measured up to a 20% increase in bulk density in the top 4 inches of grazed South Dakota streambottom soils when compared with exclosures.

Erosion

Surface soil erosion has profound effects on soil productivity and ecosystem function. Nutrients, organic matter, microorganisms, soil fauna, and roots are all concentrated in the surface soil or soil A horizon (Brady, 1984). With mismanagement, an A horizon that took thousands of years to develop can be lost in a few years or decades. With loss of the A horizon, soils lose most of their productivity because they lose the nutrients, organic matter and associated water holding capacity that were concentrated there (Batie, 1984).

In addition, accelerated surface soil erosion causes serious water quality problems by adding sediment to creeks, lakes, and reservoirs (Batie, 1984). Researchers have frequently observed that all or part of public investment in reservoirs may be wasted due to accelerated sedimentation associated with grazing and other land management practices (Bari et al., 1995; Ellison, 1960).

Reviews of the scientific literature consistently report that soil erosion increases with livestock grazing (Belsky and Blumenthal, 1995; Fleischner, 1995; Bari et al., 1995). Studies that have compared grazed areas with ungrazed exclosures have found greater sediment production rates under grazing in many plant community types (Bohn and Buckhouse, 1985; Ellison, 1960; Pluhar et al., 1987; Wood and Blackburn, 1981). As with compaction, sediment production is generally found to increase with grazing intensity (Beeskow et al., 1995; Bari et al., 1995; Thurow et al., 1986; Warren et al., 1986a; Warren et al., 1986b); although some researchers have been unable to detect a relationship between grazing intensity and erosion (e.g. Warren et al., 1986c).

One study (Thurow et al., 1986) compared sediment production under heavy continuous grazing, moderate grazing, and livestock exclosures in several plant communities in Texas. They found increases in sediment production of between 460% to 2400%, depending on plant community type, under heavy grazing compared to exclosures. However, moderate grazing did not increase sediment production in this study.

Some researchers have correlated increased surface erosion with grazing-related changes in plant communities. Ellison (1960) cited a study of succession from undisturbed plant communities to weed fields following intensive grazing in the subalpine zone in Oregon's Blue Mountains. Erosion losses from undisturbed or lightly disturbed soils were estimated at about 2 ton/acre. As grazing damage increased to a transitional mixed grass and weed stage, erosion increased to between 212 and 606 ton/acre. In the most disturbed annual weed-dominated sites, sediment production rates were approximately 927 ton/acre. Beeskow and coworkers (1995) found similar trends. They described a sequence in which grasslands with very low erosion rates were transformed into shrub steppes with much higher erosion rates by intensive sheep grazing.

Bare soil

One site characteristic that is often used as an indicator of compaction and accelerated surface erosion, as well as ecological condition generally, is the amount of bare soil present on the site (Pluhar et al., 1987; Warren et al., 1986c; Menke et al., 1996; National Research Council, 1994). Vegetation protects the soil surface from the erosive forces of trampling, raindrop impact, overland flow, and wind. Vegetation and litter also buffer the soil from compaction. This is why the National Research Council (1994) has recommended that grazed areas cannot be classified as healthy if bare ground is apparent.

Several studies have found that the percentage of bare ground on a site increases with grazing, particularly at higher stocking densities (Schulz and Leninger, 1990; Warren et al., 1986c). One study (Naeth et al., 1991) found

increases of between 270% and 470% bare ground in a grazed area compared to an ungrazed enclosure.

Riparian and meadow soils

Riparian and wetland soils are unique and very important components of California ecosystems. Riparian soils and vegetation provide irreplaceable habitat for aquatic plants and animals (Kauffman and Krueger, 1984; Naiman et al., 1993). Healthy riparian soils and vegetation also play important roles in maintaining water quality because both below- and aboveground vegetation act as filters for sediment and biological pollutants such as nutrients and microorganisms (Kauffman and Krueger, 1984; Kleinfelder, 1992; Clary et al., 1996). Many riparian soils are formed by the deposition of sediment during floods and the accumulation of undecomposed or partially decomposed organic materials under anaerobic conditions. Root densities of riparian species, such as *Carex nebrascensis*, in riparian soils are extremely high and these roots tend to make healthy riparian soils exceptionally resistant to compaction and other damage (Kauffman and Krueger, 1984; Kleinfelder et al., 1992; Manning et al., 1989).

Riparian areas, wetlands, and meadows are heavily impacted by livestock grazing. Livestock, like wildlife, are attracted by water and by the shade provided by riparian vegetation. Meadows, for example, make up only about 10% of the land area in the Sierra Nevada, but they make up a much larger proportion of the forage base (Ratliff, 1985). In the later parts of the grazing season, when upland vegetation is dry, livestock concentration in riparian zones increases because riparian zones contain forage that is still lush and palatable.

Because of the intense livestock use of riparian areas, meadows and wetlands, these areas absorb a disproportionate share of grazing damage, often with undesirable consequences. Both woody and herbaceous riparian vegetation is often overused by livestock. Trampling of streambanks damages root systems, weakens plant communities, and adds sediment to streams and other waters. As riparian soils and vegetation are damaged by grazing, their ability to trap sediment and build riparian soils is decreased. In addition, as the plant communities' ability to absorb the erosive force of water is reduced, channel downcutting or gulying may occur, lowering the water table, changing soil chemistry, and eroding soils (Hagberg, 1995; Chaney et al., 1993). Throughout California and the west, grazing-related gulying and stream downcutting have cut through organic soils that were laid down over centuries in meadows and wetlands. The process creates less productive dry meadows and weed fields (Hagberg, 1995; Cottam and Stewart, 1940; Odion et al., 1988). All of these impacts compromise the ability of the riparian areas to produce clean water and to provide habitat for native vegetation, fish and wildlife. (Kauffman and Krueger, 1984; Fleishner, 1995; Ohmart, 1996; General Accounting Office, 1988)

The connection between trampling and grazing livestock, stream channel erosion, and water table lowering has been known for decades (Sumner and Leonard, 1947; Cottam and Stewart, 1940). By the 1920s, domestic livestock numbers in Sierran meadows were already being reduced and efforts commenced to try to repair grazing-damaged meadow systems (Allen-Diaz,

1991). Discussion of this problem has intensified in recent years (National Research Council, 1994; Menke et al., 1996; Kattelman and Embury, 1996; General Accounting Office, 1988). Overgrazing has been cited as second only to damming and other direct stream channel manipulation in causing degradation of riparian areas in the Sierra Nevada foothills (Kattelman and Embury, 1996).

Streambank erosion rates and resistance to compaction is often directly related to the species composition of the streambank vegetation. *Carex nebrascensis* dominated riparian communities, for example, have been found to be unusually resistant to compaction (Kleinfelder et al., 1992). In another study, streambanks dominated by *Carex nebrascensis* and *Juncus balticus* were resistant to erosion while streambanks dominated by non-native and upland species such as *Poa pratensis* showed higher erosion rates (Dunaway et al., 1994). Other researchers identify woody species, such as willows, as critical components of bank armoring vegetation (Chaney et al., 1993).

The structure of streambank vegetation is also important in capturing sediment and reducing streambank erosion. A recent study (Clary et al., 1996) examined the relationship between the height of vegetation with the ability of the vegetation to capture and retain sediment in simulated streams. They found that, in a single sediment deposition and flushing event, shorter vegetation heights (0.5 inches) were most effective in capturing sediment. However, longer vegetation stubble heights were more effective in retaining sediment. In addition, with repeated cycles of sediment deposition and flushing, the amount of sediment retained in the longest stubble heights (8 to 12 inches) continued to increase while the amount retained in shorter vegetation (up to 3 inches) leveled off.

Soil fertility and nutrient cycles

Grazing profoundly affects both soil fertility and soil chemistry. Grazing animals, through herbivory, digestion, and excretion, dramatically increase the decomposition rate and directly alter the amounts of nutrients stored in the soil, the spatial distribution of those nutrients, and the availability of those nutrients to plants. Grazing indirectly affects soil nutrients through its effects of plant species composition and soil structure. Grazing also appears to affect soil pH. Generally pH is significantly lower in grazed areas than in ungrazed areas (Ratliff, 1985; Firestone, 1995).

Total soil nutrients

There is some variability in the scientific literature regarding the nature of the impact of livestock grazing on the total amounts of various nutrients in the soil. The effects of grazing vary depending on the nutrient studied, the location of the study and the grazing management system. However, there is little disagreement among researchers that grazing significantly changes soil nutrient status (Pieper, 1994; Laurenroth et al., 1994).

There is no disagreement, however, that livestock remove many nutrients from the soil and ecosystem. Nutrients are removed as livestock consume plants and convert them into livestock biomass which is transported off site. Nutrients are also lost through increased erosion of nutrient rich surface soil, through

accelerated decomposition of litter and organic matter, and through leaching. Some nutrients are returned to the ecosystem in feces and urine. Tiedemann and coworkers (1986) calculated a net loss of 3.2 kg nitrogen per acre under moderate grazing compared to ungrazed areas in the Pacific Northwest (cited in Pieper, 1994). Of that total, 0.9 kg nitrogen was estimated to be lost to volatilization during digestion, 2 kg was lost in livestock biomass, 0.7 kg was lost through increased erosion, and 0.22 kg was lost through increased leaching. Another study (Pieper, 1977; cited in Ratliff, 1985) estimated that 10.3% of nitrogen and 38.1% of phosphorous may be lost to the ecosystem under moderate grazing. Bauer and coworkers (1987) calculated that each 500 kg cow removes about 25 kg carbon and 4 kg nitrogen per hectare from grazed ecosystems.

Direct comparisons of grazed and ungrazed soils generally find that grazing reduces total soil nutrient levels. Comparing an 80 year old exclosure with heavily and moderately grazed pastures, researchers found significantly more total soil nitrogen in the exclosure than in the grazed areas. This nitrogen loss was observed down to 106.7 cm depth (Frank et al., 1995). Another study reports that soil nitrogen was reduced from 0.20% to 0.14% and soil carbon was reduced from 2.1% to 1.5% in heavily grazed soils compared with a 47 year old exclosure (Laurenroth et al., 1994). On the other hand, a study that examined 12 grazed and 12 ungrazed grasslands in North Dakota, found about 17% more total soil nitrogen in grazed areas. Carbon, however, showed the opposite trend, with grazed grasslands consistently showing lower total carbon levels than ungrazed areas (Bauer et al., 1987).

Spatial distribution

The spatial distribution of nutrients, particularly their horizontal distribution, is substantially altered by livestock use. Grazing animals remove plant biomass from certain areas, digest it, and redeposit it in other areas as concentrated urine and feces. Studies have found that grazing facilitates the development of a patchy distribution of soil nutrients in what would normally be more homogeneous surface soils and plant communities (Pieper, 1994). Mathews and coworkers (1994) found that because grazing cows spend much of the hot daylight hours under shade and around waterers, these areas experience substantially increased deposition of feces and urine. In that study, nitrogen, phosphorous, and potassium all accumulated in the third of the pastures closest to shade, water and supplemental feed. Each deposit of cow dung or urine acts as an island of nutrients in a pasture or meadow. Cow dung has been estimated to affect an area of about 2.6 sq. ft. (Ratliff, 1985).

Nutrient availability

Although nutrient availability is more important to ecosystem function than total soil nutrient levels, the effects of livestock grazing on soil nutrient availability has not been as well studied. The presence of a nutrient in the soil does not mean that that nutrient is available to plants. Vast amounts of nitrogen, phosphorous, carbon and other nutrients are stored in relatively unavailable forms in vegetation, litter, and in soil organic matter. It is only when vegetation and soil

organic matter are broken down by decomposition that nutrients are released into the soil solution and become available to plants and other organisms.

Livestock grazing increases the rate at which vegetation and soil organic matter are decomposed (Laurenroth et al., 1994). Vegetation grazed by livestock is rapidly decomposed during digestion and many nutrients are returned to the soil in readily available forms in feces and urine. Therefore grazing generally increases short-term soil nutrient availability. Afzal and Adams (1992) treated soil with cattle dung and simulated cattle urine. They found that the available nitrogen concentration in the soil was increased significantly under both types of excreta. A study in a California oak woodland (Dahlgren and Singer, 1991) found higher levels of highly available and mobile nitrate-nitrogen under oak canopies in grazed areas as opposed to ungrazed areas, although the difference was not statistically significant. Another California oak woodland study similarly found significantly greater levels of available nitrogen (ammonium and nitrate) under oaks in a grazed grassland than in an adjacent exclosure (Firestone, 1993).

Ecosystem impacts

Nutrient availability controls many aspects of ecosystem function. Obviously it affects the productivity of the system, at least in the short term, since soil nutrients, particularly nitrogen are often limiting for plant growth. However, increased nutrient availability also often facilitates invasion of plant communities by weedy plant species (Burke and Grime, 1996; Vinton and Burke, 1995). In addition, when nutrients, particularly nitrate, are free in the soil solution they are much more liable to be leached from the system in ground or surface water or lost through volatilization or other processes (Barber, 1984). The combination of nutrient losses through increased nutrient availability, and nutrient losses in livestock biomass described above, is likely to compromise the long term productivity of grazed ecosystems.

Soil organic matter and litter

Organic matter improves soil structure, water holding capacity, and infiltration (Brady, 1984). Soil organic matter and litter are important repositories for soil nutrients (Tisdale et al., 1985). They also help the soil to absorb and water and so increase water availability to plants throughout the growing season (Roberson, et al., 1991). Litter and soil organic matter also help soils to resist erosion, compaction and deformation (Batie, 1984; Ellison, 1960; Ratliff, 1985; Tisdale et al., 1985). Thus for hydrologic benefit managing for litter (and soil organic matter) accumulation may be as important as management for increasing live plant cover (Naeth et al., 1991).

Grazed areas tend to have lower litter levels, and consequently lower soil organic matter levels, than ungrazed exclosures. This is to be expected because of the large amount of plant biomass removed by livestock. In Colorado, 30 year old exclosures had two times the litter of grazed areas, as well as more bare soil (Schulz and Lenninger, 1990). Another study compared an 80 year old exclosure with heavily and moderately grazed treatments. They found half the mass of decomposed litter in the grazed treatments (Frank et al., 1995). Other studies

have found similar effects of grazing on both litter and soil organic matter (Naeth et al., 1991; Williams and Quinton, 1995).

Conclusion

This brief review shows that grazing significantly affects the structure, composition, fertility, chemistry, and functioning of soils, frequently in ways that compromise both short- and long-term productivity. It is essential that any management plan or environmental analysis for livestock grazing management include strong, effective, and specific measures to prevent these effects or to repair soil damage where it has already occurred. Soils must be thoroughly evaluated for grazing damage in order to develop grazing management programs that will promote soil health. The next section will discuss some approaches to making this evaluation.

Analysis of Impacts

In NEPA documents or any other land management analyses, measurable ecological indicators must be used to analyze the impacts of past and proposed management to soils and other resources. These indicators should also be used to disclose the results of environmental analyses to the public and to decisionmakers. Quantitative or objective ecological indicators provide an objective, consistent measure of resource condition. They also provide a clear and understandable basis for evaluation of the impacts of alternative management proposals by the public and decisionmakers. Ecological indicators should be used to report the current state of the resources in the planning area, and to quantitatively summarize predictions for the future state of resources under various planning alternatives.

Many indicators are available to evaluate soil quality and the impacts of management (Doran et al., 1994). Discussions of the most sensitive and useful indicators are available in the scientific literature and in land management agency guidebooks (e.g. National Research Council, 1994; USDA Forest Service 1994; Doran et al., 1994). There is remarkable consistency among these sources regarding the most useful potential indicators of soil health.

The review of scientific literature above suggests several specific soil quality indicators which are both relatively easy to measure and have been demonstrated to be sensitive to grazing impacts. These include indicators of soil structure changes such as bare soil, bulk density and infiltration rate which appear to be sensitive to grazing intensity across a wide range of soil and plant community types (Rauzi and Smith, 1973; Abdel-Magid et al., 1987; Warren et al., 1986; Warren, 1987; Kauffman and Krueger, 1984); indicators of changes in soil nutrient status such as changes in pH, or available nitrogen or oxygen (Ratliff, 1985; Tiedemann et al., 1986; Costello et al., 1991); indicators of accelerated erosion such as pedestals, rills, and bare soil (Batie, 1984; National Research Council, 1994), and indicators of damage to riparian soils such as bare or damaged streambanks (Sumner and Leonard, 1947; Cottam and Stewart, 1940; Kauffman and Krueger, 1984) and replacement of bank armoring

hydrophilic vegetation with upland species (Kleinfelder et al, 1992; Chaney et al., 1993).

A recent Soil Science Society of America publication brought together the observations of many experts regarding soil quality indicators (Doran et al., 1994). Their recommendations for useful indicators included many of these same parameters: soil bulk density, infiltration rate, organic matter, as well as soil aggregate stability, rooting depth, and the type and number of soil microorganisms and soil fauna.

The land management agencies also have produced proposals for soil quality indicators. The 1993 Region 5 Forest Service Draft Soil Quality Standards (USDA Forest Service, 1993), for example, recommend bulk density, surface organic matter, soil organic matter, and soil hydrologic function (infiltration and surface runoff) as suitable measures of soil health. The Rocky Mountain Region Forest Service Rangeland Analysis Guidebook (USDA Forest Service, 1994) presents a "Rangeland Health Evaluation Matrix" (Table 1, below) based on the recommendations of the National Research Council (1994). This matrix suggests that indicators of healthy rangeland soils should include the presence or absence of an unfragmented A horizon, pedestals, rills or gullies, scouring or sheet erosion, litter distribution, and rooting depth.

A consensus also exists regarding soil health indicators for riparian soils. Most researchers concur that soil cover, particularly cover by plant species producing large amounts of strong roots, such as some *Carex* and *Salix* species, is essential for protecting soil health (Kauffman and Krueger, 1984; Kleinfelder, 1992; Chaney et al., 1993). The height of riparian vegetation also plays a role in controlling streambank erosion and sediment capture (Clary et al., 1996). The land and resource management agencies provide ample direction for measuring riparian impacts (Bureau of Land Management, 1995; California Rivers Assessment, 1996; USDA Forest Service, 1992; Environmental Protection Agency, 1993). These sources all recommend percent vegetation cover, bank stability, and overhanging streambanks be among the indicators of streambank soil health and stability.

To summarize the recommendations of the sources reviewed above, the indicators of soil health that appear to be most useful include:

Erosion indicators:

- o Presence of rills, gullies and pedestals
- o % cover by bare soil

Compaction indicators

- o Comparisons of infiltration rates between grazed and ungrazed reference areas.
- o Comparisons of soil bulk density between grazed and ungrazed areas.
- o Comparisons of rooting depth between grazed and ungrazed areas.

Indicators of soil nutrient status

- o Comparisons of *available* nutrients, particularly nitrogen, between grazed and ungrazed areas.

- o Comparisons of soil litter and organic matter levels between grazed and ungrazed areas.

Indicators of riparian soil integrity

- o % cover by native, hydrophilic, bank armoring vegetation, such as *Carex nebracensis* and *Salix* sp., on streambanks. This should be compared with ungrazed reference sites.
- o % cover by bare soil on streambanks
- o % cover by livestock trampling damage on streambanks
- o the height of vegetation on streambanks at the end of the grazing season
- o presence of gullies
- o comparisons of the percentage of overhanging banks between grazed and ungrazed areas.
- o Depth to water table

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cont.

Methods for measuring these parameters are available in the literature cited above, from the Natural Resources Conservation Service, in land management agency guidebooks (Bureau of Land Management, 1995; California Rivers Assessment, 1996; USDA Forest Service, 1992; Environmental Protection Agency, 1993), and in Soil Science Society of America publications (e.g. Klute, 1986).

These indicators are well established in the scientific literature and in land management agency procedures. Any NEPA analysis or other resource analysis should include, at minimum, the current measurements of these indicators and should forecast the probable range of values for these indicators under each alternative.

Reference areas

In order to provide a frame of reference for measurements of soil health in grazed areas, it is critical that NEPA documents provide information on the undisturbed or pre-European values of ecological indicators. This information can be obtained from undisturbed reference sites in similar ecosystems, such as National Parks, or from records of historical conditions. This comparison provides the public and decisionmakers with a basis for assess the current and future health of the ecosystem under different management schemes.

Representative ungrazed vegetation reference plots should be placed or identified in appropriate areas to demonstrate the potential ungrazed soil and vegetation conditions such as soil bulk density, cover by litter and vegetation, and rooting depth. The use of reference areas has been recommended by a variety of land management agency directives, including Region 5 range specialists (Stokke et al., 1994), the Region 5 Ecosystem Management Handbook (Manley et al., 1994), as well as ecologists (Bock et al., 1993).

These indicators should also be used to develop quantitative Desired Condition definitions and ecological standards that will trigger changes in management (see below) (Manley et al., 1995; Doran and Parkin, 1994; Interagency Ecosystem Management Task Force, 1995; Ecological Society of America, 1995; Williams and Marcot, 1991).

Evaluation of Significance

After soil health indicators have been identified and measured, and after a forecast is made regarding the probable future values of these indicators under each alternative, NEPA documents must also evaluate which of the probable future environmental impacts of each alternative are environmentally significant. In order to do this, standards, or acceptable values, must be defined for each environmental indicator.

Standards are "acceptable" values of ecological indicators. Failure to meet standards should induce immediate changes in management to improve ecosystem health. The selection of standards should be based on ecological thresholds and on desired condition. Ecological thresholds represent risk to the integrity of the ecosystem. Once a threshold, such as loss of the A horizon, has been crossed, it becomes much more difficult, even impossible, to restore the ecosystem to its previous state. Standards should be values of ecological indicators which suggest that a threshold is being approached. Failure to meet a standard, therefore, should trigger immediate management changes. It is not adequate to wait until a threshold is reached or crossed to alter management, because by then restoration may be impossible (Milton et al., 1994; Friedel, 1991). Standards must trigger management changes while the ecosystem is still well on the healthy side of the threshold. For example, in the Rangeland Health Evaluation Matrix (Table 1), appropriate standards would be the "healthy" levels of each indicator.

An interdisciplinary team including a soil scientist, botanist, plant ecologist, range management specialist, hydrologist, and other specialists should determine the standards for each indicator based on the best scientific information for each ecosystem. One criterion for identifying a suitable standard should be that if that standard is met or exceeded, ecosystem health should improve over time. For example, a standard of 10% maximum streambank trampling would not be suitable if other indicators of ecosystem health, such as water quality, native vegetation cover, or water table depth, remain at unacceptable levels while that standard is being maintained. If maintenance of a standard for a particular ecological indicator fails to improve ecosystem health, as measured by improvement in other indicators, the standard for the indicator should be adjusted. Standards should be based on the best available information in the scientific literature. The Rangeland Health Evaluation Matrix (Table 1) (National Research Council, 1994) provides one example that has already been adopted by at least one region of the Forest Service (USDA Forest Service, 1994).

Table 1. Rangeland Health Evaluation Matrix (National Research Council, 1994)

Indicator	Healthy	At Risk	Unhealthy
<u>Soil stability and watershed function</u>			

Soil A horizon	Present and unfragmented	Present but fragmented distribution developing	Absent or present only in association with prominent plants or other obstructions.
Pedestalling	None	Pedestals present, but on mature plants only; no roots exposed	Most plants and rocks pedestaled, roots exposed
Rills and gullies	Absent or with blunted or muted features	Small, embryonic, and not connected into a dendritic pattern	Well defined, actively expanding, dendritic pattern established
Scouring or sheet erosion	None visible	Patches of bare soil or scours developing	Bare areas and scours well developed and contiguous
Sedimentation or dunes	No visible soil deposition	Soil accumulating around plants or small obstructions	Soil accumulating in large barren deposits or dunes or behind large obstructions

Distribution of nutrient cycling and energy flow

Distribution of plants	Plants well distributed across site	Plant distribution becoming fragmented	Plants clumped, often in association with prominent individuals, large bare areas between clumps.
Litter distribution and incorporation	Uniform across site	Becoming associated with prominent plants or other obstructions	Litter largely absent
Root distribution	Community structure results in rooting throughout available soil profile	Roots are absent from portions of the available soil profile	Roots only present in one portion of the available soil profile
Distribution of photosynthesis	Photosynthetic activity occurs throughout the period suitable for plant growth	Most photosynthetic activity occurs during one portion of plant growth period	Little or no photosynthetic activity on location during most of the period suitable for plant growth

Recovery mechanisms

Age-class distribution	Distribution reflects all species and age classes	Seedlings and young plants missing	Primarily old or deteriorating plants present
Plant Vigor	Plants display normal growth form	Plants developing abnormal growth form	Most plants in abnormal growth form

Germination

Microsites suitable for germination present and well distributed

Developing crusts, soil movement, or other factors degrading microsites; crusts are fragile

Soil movement of crusting sufficient to inhibit most germination and seedling establishment

The Region 5 Forest Service Draft Soil Management Handbook (USDA Forest Service, 1993) also presents some critical values or standards for soil health evaluation. However, these may not be appropriate for grazing. The Draft Soil Quality Standards appear to have been developed primarily to protect soils from logging damage. Logging is a one-time activity and soils have an opportunity to recover for years or sometimes decades afterward. This is very different from a continuous activity such as grazing where there is little or no opportunity for soil recovery. This is no doubt one reason that the Draft Standards are still be reviewed for adequacy by the Forest Service (Rob Griffiths, Soil Scientist, USFS Pacific Southwest Region, San Francisco, pers. commun.). Moreover, the Soil Management Handbook, does not provide the scientific basis for the values chosen as Soil Quality Standards. The Rangeland Health Evaluation Matrix, on the other hand, was designed by a National Research Council panel of range scientists and references the scientific studies upon which it is based.

Most of the standards and indicators in Table 1 are subjective or qualitative measures. The literature review above suggests several quantitative indicators that should also be considered for NEPA analyses. We suggest some appropriate standards for these indicators.

- o Indicator: stability of soil surface aggregates compared to ungrazed or undisturbed site (Warren, 1987; Warren et al., 1986b; Wood and Blackburn, 1981).
Standard: Soil surface aggregate stability should be equivalent to similar ungrazed sites.
- o Indicator: % cover by bare soil
Standard: bare soil should cover less than 5% of soil surface
- o Indicator: Rooting Depth
Standard: Depth to common roots. This is the depth at which root density is found to meet the definition of "common" of the Natural Resources Conservation Service (personal commun., Desi Zamudio, Soil Scientist, Toiyabe NF Sparks, NV). This depth should be equivalent for grazed sites and reference areas.
- o Indicator: Soil compaction
Standard: Soil bulk density should be equivalent (+/- 5%) between grazed sites and reference areas.
- o Indicator: Streambank trampling
Standard: Streambank trampling should be equivalent between grazed sites and reference areas.

Desired Condition

It is also important to identify values for the Desired Condition (DC) for each indicator so that progress towards complete ecological recovery and sustainability can be measured. Values of indicators at DC should be defined as the values those indicators would have on a similar ungrazed or undisturbed site. Information on potential ungrazed ecological structure and species composition may be gathered by investigating reference areas, similar plant communities in National Parks or other protected areas, by consulting key researchers, and by inspecting historical records from the last century (Ellison, 1960; Manley, 1995; Stokke et al., 1994, Bock et al., 1993). Information on the qualitative and quantitative values of ecological indicators at DC should be included in the NEPA document.

Subjective vs. objective rangeland health evaluations

Wherever subjective or qualitative measures are used to evaluate soil health, they should be verified and calibrated with objective, quantitative measures of some subsample of the planning area. The Rangeland Health Evaluation Matrix (Table 1) contains many examples of subjective or qualitative indicators of soil health. For example if a subjective evaluation is made that only patches of bare soil are present, then some transects or other quantitative methods should be used to demonstrate objectively what percentage of the planning area is in fact bare soil. The quantitative measures do not have to be performed throughout the planning area. Rather they should be performed on a random subsample of the planning area in order to ensure that the subjective evaluations are being done correctly. The information from both quantitative and qualitative measures should be included in NEPA documents so that public and decisionmakers will be able to properly evaluate the quality of the data used in NEPA documents.

In addition, annual photographs should be used to document progress towards standards. Photographs should be carefully standardized following an accepted published protocol (e.g. EPA, 1993; Kinney and Clary, 1994). Where available, photographs showing current range condition should be included in NEPA documents.

Mitigation

The NEPA document should clearly identify what actions will be taken to improve ecosystem health when standards are not being met. The preceding literature review suggests several appropriate measures to take when soil and ecosystem health is compromised by poor livestock grazing management. The major point that emerges is that increasing grazing intensity leads to increasing soil compaction and erosion, and reduced infiltration rates. It therefore follows that decreases in grazing intensity will reduce or reverse these impacts when they occur.

Many researchers suggest complete rest as the most effective and rapid method to repair grazing damage to soils and other resources, particularly in damaged riparian areas (Fleishner, 1995; Ratliff, 1985; Clary and Webster, 1989; Sumner

and Leonard, 1947; Chaney et al., 1993). Elmore and Kauffman (1994) note that livestock exclusion has consistently resulted in the most dramatic and rapid rates of riparian ecosystem recovery. These authors also note, however, that "simply excluding the riparian area into a riparian exclosure does not address the needs of the upland vegetation or the overall condition of the watershed". Unless a landscape-level approach is taken, important ecological linkages between uplands and riparian cannot be restored and riparian recovery will likely be limited. This may mean that livestock exclusion must be extended to an entire watershed.

For soils outside of riparian areas, the literature review above shows that ungrazed exclosures consistently display improved soil health over grazed areas. However, it also shows that in some cases, light or moderate intensity grazing may also be able successfully maintain soil health.

Some authors suggest that conservative grazing use and other changes in management can be very effective in protecting soil health, while maintaining some grazing use. Kauffman and Krueger (1984) have stated that herding on a somewhat daily basis has been successful in limiting number of livestock in riparian areas and improving upland utilization. Ratliff (1985) suggests several measures to deal with trampling damage in Sierran meadows including: (1) adjusting use, particularly of high elevation meadows and soft meadow edges, to periods when the soil is firm. (2) locating salt grounds well away from meadows (3) routing trails to keep livestock and people off meadows, and (4) closing (fencing) sensitive sites to livestock grazing and people. For riparian systems, Clary and Webster (1989) recommend 4-6 inch minimum stubble height remain at the end of the grazing season to protect soils in most healthy riparian areas. They also recommended setting minimum stubble heights greater than six inches for critical fisheries, easily eroded streambanks, or unhealthy riparian areas (such as those not meeting standards, or those "functioning at risk"). However, Elmore and Kauffman (1994) report 3 major short-comings of grazing strategies that fail: (1) cookbook approach, no recognition of complexities or heterogeneity of riparian zones (2) many strategies do not consider woody vegetation, streambank integrity, or riparian function (3) many strategies were developed to maximize livestock production rather than to protect other resources. Any mitigation or recovery plan must have resource condition as its first priority, rather than the continuation of historical grazing use.

Adaptive management

Certainly, changes in grazing management, particularly rest, have been shown to be very effective in controlling soil compaction, infiltration and erosion. The most effective approach to soil or ecosystem protection, therefore, is to link grazing management directly to soil or ecosystem health through monitoring and adaptive management. Below, we propose an adaptive management system for adjusting grazing management to protect soil and ecosystem health when soil health standards are not being met. Adaptive management has been repeatedly recommended as a cornerstone of ecosystem management and of sustainable management generally by the agencies (e.g. Interagency Ecosystem Management Task Force, 1995; Manley et al., 1995; Chaney et al., 1993) and by the scientific community (Ecological Society of America, 1995; Grumbine, 1994).

A framework for adaptive management is displayed below. This framework presents

1. a clear description of specific actions that will be taken,
2. a specific timeline showing when such actions will be taken, and
3. specific criteria for taking action (i.e. failure to meet standards).

This type of clear statement of what, when, and why management actions will be taken has been long requested both by the ranching community as well as by the environmental community (Dan Macon, California Cattlemen, pers. commun.; also see letter to Bertha Gillam from California Cattlemen, CNPS, California Mule Deer, and California Trout, enclosed).

Adaptive management model

1. Monitoring for ecosystem health indicators should be performed and reported every one to three years.
2. If monitoring data indicates that the condition any resource is not meeting ecological standards (see examples in section on Evaluation of Significance above), and if there is evidence that grazing impacts are causing or contributing to this unsatisfactory condition, then grazing management will be adjusted before the following grazing season.

Adjustments shall be determined by an interdisciplinary team including specialists with relevant expertise. Adjustments shall be designed to show rapid, substantive and measurable progress towards desired conditions.

Adjustments should include but need not be limited to:

- a. reductions in season of use by a minimum of 20% in the affected area. Season of use changes should be designed to improve ecological condition, OR
 - b. reductions in allowed utilization by a minimum of 20% in the affected area, OR
 - c. a combination of changes in season of use and utilization.
3. If after two years of altered management, resource condition still does not meet standards, and if there is evidence that the problem continues to be related to grazing impacts, then management will be further adjusted as in (2) above.

We recommend that the Forest Service include in NEPA documents, at both the Forest and the Allotment level, this kind of clear and specific statement of how management will be adjusted to ensure the health of the resource.

Monitoring and Enforcement

The NEPA document should also describe comprehensive monitoring plans, with timelines, to ensure that ecological indicators, compliance with standards, and progress towards DC, are measured and reported regularly and accurately.

Monitoring schedules

Monitoring for compliance with utilization, trampling and season of use standards should be performed and reported annually. Monitoring for ecological condition should be performed and reported at a minimum of every three years because this is the interval over which many management-induced changes in range condition can be detected (Sierra Nevada Ecosystem Project, 1996). Some ecological indicators, such as streambank vegetation cover and cover by bare soil, should be monitored annually because they are easy to monitor and respond rapidly to management.

Quantitative vs. qualitative monitoring

As discussed above, NEPA documents should disclose specific indicators of soil health and general ecological condition and should discuss the scientific literature that forms the basis for the selection of each indicator. Ecological indicators may be qualitative (subjective), but should be quantitative (objective) where possible. Qualitative measures should be used for routine annual monitoring of ecological condition only if quantitative measure is demonstrated to be unfeasible. If a qualitative ecological indicator, such as the BLM's definition of "proper functioning condition" for riparian areas (California Rivers Assessment, 1996; BLM, 1995), is used for routine annual monitoring, it should be supplemented by quantitative standards which will be measured periodically (minimum of every three years) to verify and calibrate monitoring results for the indicator. Quantitative indicators should also be used for more detailed site examinations if qualitative measurements show that a problem exists. We present some suitable examples of both qualitative and quantitative indicators, above.

Annual photographs should also be used to document progress towards standards. Photographs should be carefully standardized following an accepted published protocol (e.g. EPA, 1993; Kinney and Clary, 1994).

As noted above, information from both quantitative and qualitative monitoring and analyses should be included in NEPA documents so that public and decisionmakers will be able to properly evaluate the quality of the data in NEPA documents.

Conclusions and Recommendations

Several points emerge from the scientific literature on grazing and soil health and from the literature on ecosystem management.

1. All NEPA analyses should include objective or quantitative information on current soil health and its relationship to past livestock grazing management. Aspects of soil health that must be addressed include soil compaction, erosion, nutrient levels, organic matter, and litter.
2. Information in NEPA documents should include quantitative and qualitative measurements of the soil health indicators, such as those presented in the Analysis of Impacts sections above.
3. All NEPA analyses should also include predictions of future soil health under each management alternative. These predictions should also include an estimate of the probable range of values for soil health indicators under each alternative.
4. Ungrazed reference areas should be identified in National Parks or other suitable areas or established within allotments. These should be used for comparisons of ecosystem health indicators between grazed and ungrazed areas.
5. NEPA analyses should disclose information on the values of soil health indicators in ungrazed ecosystems. This information may come from reference areas or from the scientific literature.
6. Standards or acceptable values should be set by an interdisciplinary team for each soil health indicator. The NEPA document should include information from the scientific literature showing the basis for each standard and soil health indicator.
7. Desired condition should also be set for each soil health indicator based on the value of that indicator in an ungrazed or undisturbed system.
8. Monitoring protocols, with monitoring schedules, for each indicator should be included in the NEPA document. Monitoring for ecological condition should be performed and reported at minimum every three years.
9. Monitoring methods should include both qualitative techniques, for some routine monitoring, and quantitative techniques, for periodic verification and calibration of qualitative results and for in depth investigations of site conditions.
10. Whenever monitoring shows that standards are not being met, management should be adjusted immediately, before the following grazing season, to protect resources.

References

- Abdel-Magid, A.H., G.E. Schuman, and R.H. Hart. 1987a. Soil bulk density and water infiltration rates as affected by three grazing systems. *J. Range Management* 40 (4): 307-10.
- Abdel-Magid, A.H., M.J. Trlica, and R.H. Hart. 1987b. Soil and vegetation responses to simulated trampling. *J. Range Management* 40 (4): 303-6.
- Afzal, M. and W.A. Adams. 1992. Heterogeneity of soil mineral nitrogen in pasture grazed by cattle. *Soil Sci. Soc. Am. J.* 56: 1160-66.
- Allen, B. 1989. Ten years of change in Sierran stringer meadows: an evaluation of range condition models. Gen. Tech. Rep. PSW-110. USDA Forest Service Pacific Southwest Research Station, Albany, CA.
- Allen-Diaz, B. 1991. Water table and plant species relationships in Sierra Nevada Meadows. *Amer. Midl. Naturalist* 126(1): 30-42.
- Andre, J.M. 1990. Population biology and conservation of *Abronia alpina* in the southern Sierra Nevada, California. M.S. Thesis. Humboldt State University, Arcata, CA.
- Barber, S.A. 1984. Soil Nutrient Bioavailability: a Mechanistic Approach. John Wiley and Sons, New York, NY.
- Bari, F., M.K. Wood, and L. Murray. 1995. Livestock grazing impacts on interrill erosion in Pakistan. *J. Range Management* 48(3): 251-7.
- Batie, S.S. 1984. Soil Erosion: crisis in America's croplands? The Conservation Foundation, Washington, DC.
- Bauer, A., C.V. Cole, and A.L. Black. 1987. Soil property comparisons in virgin grasslands between grazed and nongrazed management systems. *Soil Sci. Soc. Am. J.* 51(1): 176-82.
- Beeskow, A.M., N.O. Elissalde, and C.M. Rostagno. 1995. Ecosystem changes associated with grazing intensity on the Punta Ninfas rangelands of Patagonia, Argentina. *J. Range Management* 48(6): 517-22.
- Belsky, A. J. and D. M. Blumenthal. 1995. Effects of livestock grazing on upland forests, stand dynamics, and soils of the interior West: livestock and the "forest health" crisis. *Conservation Biology*. in press.
- Bock, C.E., Bock, J.H. and H.M. Smith. 1993. Proposal for a system of federal livestock exclosures on public rangelands in the western United States. *Conservation Biology* 7(3): 731-3.

- Bohn, C.C. and J.C. Buckhouse. 1985. some responses of riparian soils to grazing management in northeastern Oregon. *J. Range Management* 38(4): 378-381.
- Brady, N.C. 1984. The Nature and Properties of Soils. 9th Edition. MacMillan Co. New York, NY.
- Bureau of Land Management. 1995. Riparian area management. Process for assessing proper functioning condition. TR 1737-9 1993. USDI Bureau of Land Management, Denver, CO.
- Burke, M.J.W. and J.P. Grime. 1996. An experimental study of plant community invasibility. *Ecology* 77(3): 776-90.
- California Rivers Assessment. 1996. Professional Judgment Assessment of Riparian Condition. Information Center for the Environment, University of California, Davis, CA.
- Chaney, E.; W. Elmore and W.S. Platts. 1993. Managing change; livestock grazing on western riparian areas. U.S. Environmental Protection Agency, Denver, CO. Northwest Resource Information Center, Eagle, ID.
- Clary, W.P., C. I. Thornton, and S.R. Abt. 1996. Riparian stubble height and recovery of degraded streambanks. *Rangelands* 18(4): 137-40.
- Clary, W.P. and B.F. Webster. 1989. Managing grazing of riparian areas in the intermountain region. Gen. Tech. Rpt. INT-263. USDA Forest Service Intermountain Region, Ogden, UT.
- Costello, L.R., J.D. MacDonald, and K.A. Jacobs. 1991. Soil aeration and tree health: correlating soil oxygen measurements with the decline of established oaks. In: Symp. on oak woodlands and hardwood rangeland management. Gen. Tech. Rpt. PSW-126. USDA Forest Service, Pacific Southwest Research Station, Albany, CA.
- Cottam, W.P. and G. Stewart. 1940. Plant succession as a result of grazing and of meadow desiccation by erosion since settlement in 1862. *J. Forestry* 38: 613-26.
- Dahlgren, R. and M.J. Singer. 1991. Nutrient cycling in managed and unmanaged oak woodland grass ecosystems. Symposium on Oak Woodlands and Hardwood Rangeland Management. Gen. Tech. Rpt. PSW-126. USDA Forest Service Pacific Southwest Research Station, Albany, CA.
- Doran J.W., D.C. Coleman, D.F. Bezdicek, and B.A. Stewart eds. Defining Soil Quality for a Sustainable Environment. Special publication No. 35. Soil Science Society of America, Madison, WI.
- Dunaway, D., S.R. Swanson, J. Wendel, and W. Clary. 1994. The effect of herbaceous plant communities and soils textures on particle erosion of alluvial streambanks. *Geomorphology* 9: 47-56.

- Ecological Society of America. 1995. The scientific basis for ecosystem management. Ecological Society of America, Washington, DC.
- Ellison, L. 1960. Influence of grazing on plant succession of rangelands. Bot. Review 26(1): 1-78.
- Elmore, W. and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. In: M. Vavra, W.A. Laycock, and R.D. Pieper Eds. Ecological Implications of Livestock herbivory in the West. Society for Range Management, Denver, CO.
- Environmental Protection Agency. 1993. Monitoring protocols to evaluate water quality effects of grazing management on western rangeland streams. EPA 910/R-93-017. U.S. Environmental Protection Agency, Seattle, WA.
- Firestone, M.K. 1995. Nutrient cycling in a managed oak woodland-grass ecosystem. Final Report to the Integrated Hardwood Range Management Program, University of California.
- Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology 8(3): 629-44.
- Frank, A.B., D.L. Tanaka, L. Hofmann, and R.F. Follett. 1995. Soil carbon and nitrogen of northern Great Plains grasslands as influenced by long-term grazing. J. Range Management 48(5): 470-4.
- Friedel, M.H. 1991. Range condition assessment and the concept of thresholds: a viewpoint. J. Range Management 44(5): 422-6.
- General Accounting Office. 1988. Public rangelands: some riparian areas restored but widespread improvement will be slow. GAO/RCED-88-105. U.S. General Accounting Office, Washington, DC.
- Green, D.M. and J.B. Kauffman. 1995. Succession and livestock grazing in a northeastern Oregon riparian ecosystem. J. Range Management 48(4): 307-13.
- Grumbine, R.E. 1994. What is Ecosystem Management? Conservation Biology 8(1): 27-38.
- Hagberg, T.D. 1995. Relationships between hydrology, vegetation and gullies in montane meadows of the Sierra Nevada. M.S. Thesis. Humboldt State University, Arcata, CA.
- Interagency Ecosystem Management Task Force. 1995. The ecosystem approach: healthy ecosystems and sustainable economies. Vol. I. Council on Environmental Quality, Washington, DC.

- Kattelman, R. and M. Embury. 1996. Riparian areas and wetlands. In: Sierra Nevada Ecosystem Project: Final report to Congress, Vo.. III. Centers for Water and Wildland Resources, University of California, Davis.
- Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications: a review. *J. Range Management* 37(5): 430-7.
- Kinney, J.W. and W.P. Clary. 1994. A photographic utilization guide for key riparian graminoids. Gen. Tech. Rpt. INT-GTR-308. USDA Forest Service. Intermountain Research Station, Ogden, UT.
- Kleinfelder, D., S. Swanson, G. Norris and W. Clary. 1992. Unconfined compressive strength of some streambank soils with herbaceous roots. *Soil Sci. Soc. Am. J.* 56(6): 1920-5.
- Klute, A. 1986. Methods of Soil Analysis. Agronomy Monograph 9. Soil Science Society of America, Madison, WI.
- Lauenroth, W.K., D.G. Milchunas, J.L. Dodd, R.H. Hart, R.K. Heitschmidt, and L.R. Rittenhouse. 1994. Effects of grazing on ecosystems of the Great Plains. In: M. Vavra, W.A. Laycock, and R.D. Pieper Eds. Ecological Implications of Livestock herbivory in the West. Society for Range Management, Denver, CO.
- Laycock, W.A., H. Buchanan, and W.C. Krueger. 1972. Three methods of determining diet, utilization, and trampling damage on sheep ranges. *J. Range Management* 25: 352-6.
- Manley, P.N. and others. 1995. Sustaining ecosystems: a conceptual framework. Version 1.0. USDA Forest Service Pacific Southwest Region, San Francisco, CA.
- Manning, M.E., S.R. Swanson, R. Svejcar, and J. Trent. 1989. Rooting characteristics of four intermountain meadow community types. *J. Range Management* 42(4): 309-12.
- Mathews, B.W., L.E. Sollenberger, V.D. Nair and C.R. Staples. 1994. Impact of grazing management on soil nitrogen, phosphorus, potassium and sulfur distribution. *J. Environ. Qual.* 23: 1006-13.
- Menke, J.W., C. Davis, and P. Beesley. 1996. Rangeland Assessment. In: Sierra Nevada Ecosystem Project: Final report to Congress, Vo.. III. Centers for Water and Wildland Resources, University of California, Davis.
- Milton, S.J., W.R.J. Dean, M.A. du Plessis, and W.R. Siegfried. 1994. A conceptual model of arid rangeland degradation. *BioScience* 44(2): 70-75.
- Naeth, M.A., A.W. Bailey, D.J. Pluth, D.S. Chanasyk, and R.T. Hardin. 1991. Grazing impacts on litter and soil organic matter in mixed prairie and fescue grassland ecosystems of Alberta. *J. Range Management* 44(1): 7-12.

- Naiman, R.J., H. Decamps, M. Pollock. 1993. The role of riparian corridors in maintaining regional biodiversity. *Ecological Applications* 3(2): 209-12.
- National Research Council, 1994. Rangeland health: new methods to classify, inventory, and monitor rangelands. National Academy Press, Washington, DC.
- Odion, D.C., T.L. Dudley and C.M. D'Antonio. 1988. Cattle grazing in southeastern Sierran meadows: ecosystem change and prospects for recovery. In: C.A. Hall and V. Doyle-Jones, Eds. *Plant Biology of Eastern California - Natural History of the Inyo-White Range symposium*. Vol. 2.
- Ohmart, R.D. 1996. Historical and present impacts of livestock grazing on fish and wildlife resources in western riparian habitats. In: P.R. Krausman, Ed. Rangeland Wildlife. Society for Range Management, Denver, CO.
- Orr, H.K. 1960. Soil porosity and bulk density on grazed and protected Kentucky bluegrass range in the Black Hills. *J. Range Management* 13: 80-86.
- Pieper, R.D. 1994. Ecological implications of livestock grazing. In: M. Vavra, W.A. Laycock, and R.D. Pieper Eds. Ecological Implications of Livestock herbivory in the West. Society for Range Management, Denver, CO.
- Pluhar, J.J., R.W. Knight, and R.K. Heitschmidt. 1987. Infiltration rates and sediment production as influenced by grazing systems in the Texas rolling plains. *J. Range Management* 40(3): 240-3.
- Ratliff, R.D. 1985. Meadows in the Sierra Nevada of California: state of knowledge. Gen. Tech. Rep. PSW-84. USDA Forest Service Pacific Southwest Forest and Range Experiment Station, Albany, CA.
- Rauzi, F. and F.M. Smith. 1973. Infiltration rates: three soils with three grazing levels in northeastern Colorado. *J. Range Management* 26(2): 126-129.
- Roath, L.R. and W.C. Krueger. 1982. Cattle grazing influence on a mountain riparian zone. *J. Range Management* 35(1): 100-3.
- Roberson, E.B., S. Sarig, and M.K. Firestone. 1991. Cover crop management of polysaccharide-mediated aggregation in an orchard soil. *Soil Science Society of America Journal*. 55(3): 734-9.
- Schulz, T.T. and W.C. Lenninger. Differences in riparian vegetation structure between grazed areas and exclosures. *J. Range Management* 43(4): 295-9.
- Sierra Nevada Ecosystem Project. 1996. Status of the Sierra Nevada. Final Report to Congress. Preprint June 7, 1996. Centers for Water and Wildland Resources, University of California, Davis, CA.
- Society for Range Management. 1995. Evaluating Rangeland Sustainability: the evolving technology. SRM Task Group on Unity in Concepts and Terms. *Rangelands* 17(3): 85-92.

- Stokke, S., K. Foster, R. Giffen, G. Bell, L. Atencio, J. Menke, and B. Kinney. 1994. Sequoia National Forest Range Management Program Review. Memo to Sandra Key, Forest Supervisor, October 21, 1994.
- Sumner, L. and R.M. Leonard. 1947. Protecting mountain meadows. Sierra Club Bulletin 32(5): 53-70.
- Thurow, T.L., W.H. Blackburn, C.A. Taylor, Jr. 1986. Hydrologic characteristics of vegetation types as affected by livestock grazing systems, Edwards Plateau, Texas. J. Range Management 39(6): 505 - 8.
- Tiedemann, A.R., H.R. Sanderson, and N.J. Cimon, 1986. Future site productivity considerations of short-duration, high intensity grazing. In: J.A. Tiedemann Ed. Short Duration Grazing. Washington State Univ., Pullman, WA.
- Tisdale, S.L., W.L. Nelson, J.D. Beaton. 1985. Soil Fertility and Fertilizers 4th edition. Macmillan Publishing, New York, NY.
- USDA Forest Service. 1994. Region 2 Rangeland Analysis and Management Training Guide. USDA Forest Service Rocky Mountain Region, Denver, CO.
- USDA Forest Service. 1993. Draft Soil Management Handbook. Region 5 Supplement No. 1. FSH 2509.18. USDA Forest Service, Pacific Southwest Region, San Francisco, CA.
- USDA Forest Service. 1992. Integrated riparian evaluation guide. USDA Forest Service Intermountain Region, Ogden, UT.
- van der Valk, A.G. and R.L. Pederson. 1989. Seed banks and the management and restoration of natural vegetation. In: M.A. Leck, V.T. Parker, R.L. Simpson, Eds. Ecology of Soil Seed Banks. Academic Press, New York, NY.
- Vinton, M.A. and I.C. Burke. 1995. Interactions between individual plant species and soil nutrient status in shortgrass steppe. Ecology 76(4): 1116-1133.
- Warren, S.D. 1987. Soil hydrologic response to intensive rotation grazing: a state of knowledge. In: Y.S. Fok Ed. Infiltration Development and Application. Pre-conference proceedings of the International Conference on Infiltration Development and Application. Water Resources Research Center, University of Hawaii at Manoa, Honolulu.
- Warren, S.D., T.L. Thurow, W.H. Blackburn, and N.E. Garza. 1986a. The influence of livestock trampling under intensive rotation grazing on soil hydrologic characteristics. J. Range Man. 39(6): 491-5.
- Warren, S.D., M.B. Nevill, W.H. Blackburn, and N.E. Garza. 1986b. Soil response to trampling under intensive rotation grazing. Soil Sci. Soc. Am. J. 50(5): 1336-41.

Warren, S.D., W.H. Blackburn, and C.A. Taylor, Jr. 1986c. Soil hydrologic response to number of pastures and stocking density under intensive rotation grazing. *J. Range Management* 39(6): 500-4.

Williams, B.L. and B.G. Marcot. 1991. Use of biodiversity indicators for analyzing and managing forest landscapes. *Trans. North American Wildlife and Natural Resources Conf.* 56: 613-27.

Williams, W.D. and D.A. Quinton. 1995. Grazing effects on germinable seeds on the fescue prairie. *J. Range Management* 48(5): 423-30.

Winkel, V.K. and B.A. Roundy. 1991. Effects of cattle trampling and mechanical seedbed preparation on grass seedling emergence. *J. Range Management* 44(2): 176-180.

Wood, M.K. and W.H. Blackburn. 1981. Sediment production as influenced by livestock grazing in the Texas rolling plains. *J. Range Management* 34(3): 228-31.

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Grazing Economic Data from: Holecheck, et al., 1995

	Livestock Type	Grazing Intensity	Percent Forage Use	Net return per acre
Desert				
Utah	Ewe-lamb	Heavy	68	\$1.69
		Moderate	35	\$3.45
New Mexico	Cattle/sheep	Heavy	45-60	\$0.11
		Moderate	30-45	\$0.17
	Cow/Calf	Heavy	50-60	\$0.32
		Moderate	30-35	\$0.75
Coniferous Forest				
Colorado	Cattle/ yearlings	Heavy	50	\$0.74
		Moderate	30	\$1.34
		Light	15	\$0.98
Oregon	Cattle/ yearlings	Heavy	34	\$2.55
		Moderate	28	\$2.69
		Light	17	\$2.15

Sheep production: Desert Experimental Range, Utah

	Grazing Intensity	
	Heavy	Moderate
Percent forage utilization	68	35
Death loss (%)	8.1	3.1
Lambs weaned per ewe (lb)	67	77
Net income (3000 head flock)	\$5,072.00	\$10,390.00
Net income per ewe	\$1.69	\$3.45

Cattle production: Southern Great Plains Experimental Range, Oklahoma

	Grazing Intensity	
	Heavy	Moderate
Acres per cow	12	17
Percent forage utilization	62	44
Calf crop weaned (%)	81	92
Calf weaning weight (lb)	388	461
Net return per cow	\$9.00	\$29.44
Net return per acre	\$0.70	\$1.88

OFFICE OF

BOARD OF SUPERVISORS

500 ARGONAUT LANE • JACKSON, CA 95642-9534 • (209) 223-6470



August 26, 1997

Mr. Ed Hastey, State Director
 Bureau of Land Management
 California State Office
 2135 Butano Drive
 Sacramento, CA 95835

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RE: Rangeland DEIS

Dear Mr. Hastey:

By direction of the Amador County Board of Supervisors, I am responding to the Rangeland Health Standards and Guidelines for California and Northwest Nevada Draft EIS.

17-1

Amador County prefers Alternative 1 as described in the DEIS.

As you know, the BLM created three Resource Advisory Councils for the areas in your jurisdiction. These councils included members of the interested public, including members representing elected officials. The elected officials, Bill Maze, Tulare County; Nancy Huffman, Modoc County; and Denny Bungarz, Glenn County, have recommended Alternative 1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law, the BLM and has the least negative effect to the cattle industry and the Counties.

Alternative 1 was developed by a group of citizens with varied backgrounds and interest after considerable training on basic ecological processes.

Your favorable consideration of our recommendation is appreciated.

Sincerely,

A handwritten signature in dark ink, appearing to read "Richard Vinson".

Richard Vinson
 Acting Chairman
 Amador County Board of Supervisors

RV:sw

SW-1-630

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 SACRAMENTO, CALIF.

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COUNTY OF SISKIYOU

Letter 18.1, page 1

Board of Supervisors

P.O. Box 338 • 311 Fourth Street
Yreka, California 96097

(916) 842-8081
FAX (916) 842-8093

August 27, 1997

Ed Haste, State Director
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95835

RE: Rangeland DEIS

Dear Mr. Haste:

By direction of the Siskiyou County Board of Supervisors, I am responding to the Rangeland Health Standards and Guidelines for California and Northwest Nevada Draft EIS

We favor Alternative 1 as described in the DEIS.

As you know, the BLM created three Resource Advisory Councils for the areas in your jurisdiction. These councils included members of the interested public, including members representing elected officials. The elected officials; Bill Maze, Tulare County, Nancy Huffman, Modoc County, and Denny Bungara, Glenn County, have recommended Alternative 1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law, the BLM, and has the least negative effect to the cattle industry and the counties.

Alternative 1 was developed by a group of citizens with varied backgrounds and interest after considerable training on basic ecological processes.

We favor Alternative 1 as described in the DEIS, and request your favorable consideration of our recommendation.

Sincerely,
SISKIYOU COUNTY BOARD OF SUPERVISORS

Bill Hoy, Chair

BH:sb

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18.1-1

JOAN T. SMITH
District 1

LA VADA ERICKSON
District 2

BILL HOY
District 3

JERRY GIARDINO
District 4

KAY M. BRYAN
District 5



COUNTY OF SISKIYOU

Board of Supervisors

P.O. Box 338 • 311 Fourth Street
Yreka, California 96097

(916) 842-8081
FAX (916) 842-8093

August 29, 1997

Mr. Ed Hasty, State Director
Bureau of Land Management
2135 Batano Drive
Sacramento, California 95825

Attention: Rangeland DEIS

Dear Mr. Hasty:

Subject: Draft Environmental Impact Statement Rangeland Health Standard and
Guidelines for California and Northwestern Nevada - Review and Comment

Thank you for the opportunity to comment on the DEIS on Rangeland Health Standards and Guidelines for California. The Siskiyou County Board of Supervisors maintains an interest in the protection of rangeland resources, a resource that contributes so much in sustaining our local economy.

18.2-1 The draft EIS appears to present a thoroughly comprehensive study on the environmental effects of the proposed alternatives relative to direct impacts. Although the document provides excellent documentation and sound discussions on the numerous issues involved in rangeland health, it does not sufficiently address cumulative effects on this and other Federal actions, e.g., the Federal Endangered Species Act.

Please keep our Board informed of any further action involved with the DEIS. Again, thank you for the opportunity to comment on this document.

Sincerely,

Bill Hoy, Chairman
Siskiyou County Board of Supervisors

DCB/lrf

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JOAN T. SMITH
District 1

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District 2

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District 3

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KAY M. BRYAN
District 5



Board of Supervisors

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WILLIAM D. BIXBY, Administrative Officer
County Administration Center
221 South Roop Street
Susanville, CA 96130

(916) 251-8333
FAX (916) 257-4898

August 26, 1997
(#970815ALLL)

Mr. Ed Hastey, State Director
Bureau of Land Management
California state Office
2135 Butano Dr
Sacramento CA 95835

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Subject: Rangeland DEIS.

Dear Mr. Hastey:

By direction of the Lassen County Board of Supervisors, I am responding to the Rangeland Health Standards and Guidelines for California and Northwest Nevada Draft EIS.

19-1 [We favor Alternative 1 as described in the DEIS.

As you know, the BLM created three Resource Advisory Councils for the areas in your jurisdiction. These councils included members of the interested public, including members representing elected officials. The elected officials: Bill Maze, Tulare County, Nancy Huffman, Modoc County and Denny Bungarz, Glenn County, have recommended Alternative 1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law, the BLM and has the least negative effect to the cattle industry and the counties.

Alternative 1 was developed by a group of citizens with varied backgrounds and interests after considerable training on basic ecological processes.

Your favorable consideration of our recommendation is appreciated.

Sincerely,

LYLE L. LOUGH, Chairman

LLL:vel

August 19, 1997



Don P. Mullally
10418 Gothic Avenue
Granada Hills, CA 91344

Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95825

Attn: Rangeland DEIS

Comments to: Rangeland Health Standards and Guidelines for
California and Northwestern Nevada Draft EIS

I. I submit that several subjects of importance have not been adequately considered or resolved in the Draft EIS for California rangelands administered by the Bureau of Land Management. They are discussed as follows:

1. Vegetation of in the cold boreal climates is particularly sensitive to grazing by sheep and cattle. Herbs, shrubs, and young trees existing near and above timberline are particularly sensitive and rebound from grazing most slowly.

Only minimal grazing should be permitted in vegetation types with canopies dominated by trees including lodgepole pine, western white pine, red fir, foxtail pine, bristlecone pine, white-bark pine, and mountain hemlock; or in semi-arid environments devoid of such trees but similar in zonal temperature and elevation.

20-1
cont.

Grazing should not be permitted in the krummholz belt or in alpine environments above the highest zone of trees.

20-2

2, Most of the rangelands serve as winter refuges and feeding-foraging areas for species of animals which inhabit higher elevations during the seasons of late spring to mid-fall. Prominent among these species of wildlife are elk, deer, mountain lions, bobcats, coyotes; woodpeckers and various song and shore birds and raptors such as red-tail hawks, goshawks, and great-horned owls. Lowland refuges should be maintained and preserved. Corridors for elevational migration of wildlife must be preserved. What is BLM doing or planning to do in the future to satisfy this need?

20-3

3. The principal or representative plant communities and vegetation types of each region should be preserved within refuges of adequate size. Grazing should be banned from the refuges to insure the survival of all native plants and the development or re-establishment of natural communities. A thin system of such refuges would insure the survival of plant diversity despite losses of species and communities suffered on land subject to grazing or multi-purpose usage. Is such a system of refuges presently in place or planned for the near future?

20-4

4. Recruitment and episodic recruitment of native plants are frequently mentioned in the EIS (ie. page 6, in chapter 4). However, long-term survival seems to be of less concern to the

20-4.
cont.

Bureau. Recruitment involving the oaks and many other plants has little value or significance if the young plants are allowed to be destroyed by domestic grazing animals or plant community destruction through development or land sales. Changes as presented on page 6 should include survival and maturation and the development of plant communities and age classes. Do BLM policies include general rules which allow for the maturation of the results of recruitment?

20-5

5. Rangeland health, by any reasonable and intelligent definition, should be largely determined by the diversity of the vegetation and by the age classes of the species of plants which should be on the land. The characteristics of the soil surface and the height and density of non-native grasses should not be of near total importance. Before the European influence, healthy rangeland (utilized by native animals) had high diversity and depth in age classes. To a high degree, the further the rangelands diverge from this standard, the lower their health. A rich influx of economically valuable non-native species many provide another dimension to range health.

II. Alternatives.

20-6

Alternative 4 is my choice.

Alternative 4 is selected for several reasons:

1. The federal public lands of California have been carelessly abused for a century, and in some areas even longer. Since land abuse has been long-standing, efforts directed towards relatively rapid resource recoveries are validated and now preferred.

20-6
cont.

2. Many oak woodlands and wetlands absolutely require quick actions for preservation and reasonable recovery. Restored environments will continue to sustain ranching and meat production into the future. If grazing lands continue to degrade, returns from the land will gradually diminish.

3. In addition, some restored environments available to the public will attract greater numbers of recreationists. Recreationists buy equipment and supplies and spend much money in rural areas improving the state and the local economies.

August 26, 1997

Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95825

Attention: Rangeland DEIS

To Whom it May Concern:

I appreciate the opportunity to comment on "Rangeland Health Standards and Guidelines for California and Northwestern Nevada DEIS". However, I have a number of concerns and suggestions.

21-1

Basically, I support Alternative 1 because I feel that less federal control and more local control is the way to achieve any objective. More knowledgeable decisions can be made by the people working on the ground--they can be more site specific. I believe in working from the bottom up, not the top down.

As presented in Appendix 18, the impacts per alternative are, in the majority of the cases, the same between Alternatives 1-3. Therefore, the most logical and "user friendly" (both to land and permittee) approach is the local approach - Alternative 1.

21-2

I would like to point out some inconsistency in text. In the Table of Contents, Chapter 2, 2.3 Alternative 2: the wrong title is listed. 2.4 Alternative 3: the wrong title is listed. The two have been transposed.

Chapter 1, page 8, 1.9 Analysis Area states "Currently there are 705 grazing allotments . . ." in Table 1.9: Analysis Area, the Total # Allotments is 667. Why the difference?

General Comments:

21-3

I strongly believe that for any standard, guideline, term or condition to work, it must be capable of being achieved, based on sound science or good common sense, and be measurable, understandable, and economically feasible.

21-4

Not enough emphasis is placed on the fact that healthy rangelands are important to satisfy values and "produce commodities".

21-5

Not enough emphasis is placed on cost effectiveness. (The cost to implement some guidelines is just not worth the end result.)

Specific Comments:

CHAPTER 2 DESCRIPTION OF ALTERNATIVES

2.53 Susanville RAC Guidelines for Livestock Grazing

Preamble

- 21-6 Insert at beginning of first paragraph: "Rangeland Health is important in order to satisfy values and produce commodities. (Rangeland Health, 1994, pp. 4 and 5).\" Healthy Rangelands contribute . . . the most reliable "insert-production" of rangeland resources "insert-and commodities."

Standards

Second paragraph, end of first sentence, add - but realize that perfection is unattainable.

Susanville RAC Guidelines for Livestock Grazing

- 21-7 [Guideline 1: A stubble height threshold "insert-site specific," will be . . .
- 21-8 [Guideline 3: Question the meaning of what plant growth. " . . . and during critical times of plant growth." Does this mean all plant growth? or just sensitive plant growth?
- 21-9 [Guideline 4: Not only plans for grazing, but the allowance of other uses need to be managed or restricted to ensure the goal of achieving rangeland health.
- 21-10 [Guideline 12: insert after first sentence "And will not be held accountable for the self same transitional opportunities or disasters."
- 21-11 [Guideline 14: This guideline should be eliminated. It would need personnel and time that are not available to implement punitive measures across the board. Initiation of allotment specific analysis for terms and conditions on individual permits will be conducted on a priority bases. Therefore taking care of any extreme existing conditions first. Transitional guidelines, therefore, are unnecessary.

CHAPTER 3 AFFECTED ENVIRONMENT

3.3.3 Upland Conditions and Trends. Problems with the use of Ecological Site Inventory (ESI) to determine range condition.

21-12 The concept of proper functioning conditions of Uplands needs to be incorporated into BLM's inventory procedures.

Clarify that when the condition is poor, with no upward trend, this does not necessarily mean that the area is in poor health. Why make or use these classifications if it doesn't represent the true area health?

3.8 Recreation

21-13 Sixth paragraph. " . . . and the visual intrusion of seeing livestock in primitive areas where people expect a natural environment." Question fact of this statement. Question whether it is a visual intrusion? and that livestock are not natural?

CHAPTER 4 IMPACT ANALYSIS

4.2.9 Cultural Resources Ranching Communities

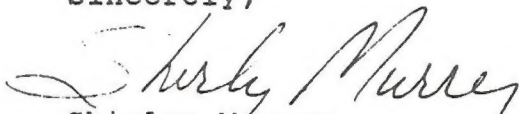
21-14 "To most ranchers, there will be no impacts to their traditional ranching lifeway . . ." Question the truth of this statement. There is always an impact.

4.3.4.1 EIS Study Area Analysis Income & Employment Impact

21-15 This section states that a reduction in AUM's resulted in income and employment loss. How can the Standards & Guidelines be implemented effectively when there are not enough personnel to accomplish this? Therefore, is this whole process capable of being achieved and cost effective?

Thank you for your consideration of these comments.

Sincerely,



Shirley Murrer
PO Box 151
Susanville, CA 96130

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Sveinn Erik Ólafsson
 6400 Christie Avenue #4210
 Emeryville, CA 94608-1040
 August 27, 1997

Ed Hastey, State Director
 Bureau of Land Management
 California State Office
 2135 Butano Drive
 Sacramento, CA 95825

Dear Mr. Hastey:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement, Rangeland Health Standards and Guidelines for California and Northwestern Nevada dated May, 1997.

The purpose of environmental documents is disclosure of information. I found this document extremely hard to read, especially since it contains so much verbiage and so little useful information. The appendices are especially cryptic and lacking useful information. I find the document to be lacking coverage of the subject of mitigation and monitoring of the standards set forth in the document. I will be specific in my comments as follows:

General comments:

22-1

1.) Though standards and goals are set forth in the document, albeit in a very general fashion, there is no mention in the document for specific mitigation strategies for countering the devastating effect of grazing animals on the native habitat of numerous species. By mitigation strategies, I mean such protective mechanisms such as fencing off riparian areas to prevent the damaging effect that commercial grazing animals have on stream habitats. These damaging effects include an increase in turbidity of the waters through erosion of stream banks, collapsing undercuts of stream banks, introduction of urine and fecal material into the stream water and destruction of stream canopy, emergent vegetation and introduction and spread of such water-borne diseases as giardia and cryptosporidium. This fencing needs to be carefully designed to keep commercial grazing animals out of the riparian areas, yet still allowing native animals full use of the riparian areas and corridors. Another example of a possible protective mechanism is prohibition on the use of rock slope protection (rip rap) in riparian areas. Once a repair has been made using rock, the canopy in that area of the stream is deficient forever, whereas use of alternate repair strategies such as geo-grid slopes maintain the possibility of canopy restoration.

22-2

2.) There are no specific commitments to mitigation or monitoring the health of the rangeland under the jurisdiction of the Bureau of Land Management and no date of implementation of any mitigation measures or review of this document.

22-3

3.) There is no mention of the acreage of jurisdictional waters of the U.S. that come under the requirements of a 404 permit from the U.S. Army Corps of Engineers. This would be the area within the Ordinary High Water Mark (OHWM) for each stream, perennial or ephemeral, and all other water bodies within the bounds of BLM grazing land including wetlands as defined in the 1987 Corps Manual.

- 22-4 4.) The document does not mention the threat of cryptosporidium contamination of water systems by grazing animals. Cryptosporidium is a health hazard for humans and can be life threatening to immunosuppressed individuals. The document should discuss the implications of water contamination by animal borne pathogens and how these effects can be mitigated.
- 22-5 5.) There is no mention of restoration of areas that have been over grazed, how this will be accomplished, or monitored.
- 22-6 6.) The maps on in Chapter 5, MAP-1 , 2, 3, and 4 are not very helpful in determining location of BLM administered lands. They are just gray smudges on a small map of California. Closer, separate maps of each resource area is needed to allow the reader to understand the map. Regardless, it is hard to follow listed species possibilities when the areas are outlined as smudges on small map.
- 22-7 7.) These may be included in the special study, but there is no reference in the document to having gotten a listing of current listed species from either the U.S. Fish and Wildlife Service or the California Department of Fish and Game. These lists should be included and at least referenced in the document and the date which they were obtained.

Specific Comments:

- 1.) Page 61-63
- 22-8 a.) What is the makeup of the permittees granted grazing rights on BLM land, i.e. how many are Americans and how many are foreign-owned?
- 22-9 b.) How do grazing rights rates on BLM land compare to those on other properties both government and privately owned land?
- 22-10 c.) How much do the taxpayers of the U.S. benefit from the granting of grazing rights on this public land?

Appendix 9

- 22-11 Page A9-9 The guidelines provided on this page all use the term "should" instead of the more enforceable "shall". It is my feeling that "shall" should replace the "shoulds" in this document to make these guidelines more enforceable, and thus protect the habitat.

Appendix 11

- 22-12 a.) What is meant by UG "ungrazed", for instance Jepson's onion ,*Allium jepsonii*, is found in serpentine areas and volcanic slopes and flats, 300 m to 600 m altitude. Are these areas fenced off in the Folsom Resource area or is it the document's contention that these areas don't exist within grazing areas? How do you know? Please at least give reference to the study that made this finding.
- b.) What is the basis for finding a "neutral" or "positive" effect of grazing on these species, i.e. what specific studies have been performed to show a neutral effect of grazing on these species. Direct reference or footnotes of the scientific studies used as a basis for these findings would be useful in this regard. Also less use of acronyms and codes would make these tables easier to read.
- c.) Many species are missing from Appendix 11. I will give a few for instances, but there is not enough room in this letter to cover them all:

Scientific Name	Common Name	Federal Status	California Status	Characteristics per Jepson
<i>Amsinckia grandiflora</i>	large-flowered fiddleneck	ENDANGERED	ENDANGERED	Central Valley, grassy

<i>Astragalus agnicidus</i>	Humboldt milkvetch	ENDANGERED	ENDANGERED	slopes below 300 m. Open soil in woodland south Humboldt Co.
<i>Astragalus albens</i>	Cushenbury milkvetch	ENDANGERED	NONE	Rocky areas 1200-1800 m ne San Bern.
<i>Astragalus clarianus</i>	Clara Hunt's milkvetch	PROPOSED ENDANGERED	THREATENED	Open grassy areas Sonoma, Napa Cos.
<i>Atriplex tularensis</i>	Bakersfield smallscale	SPECIES OF CONCERN	ENDANGERED	Alkaline soils, lakeshore, south San Joaquin Valley
<i>Berberis nevinii</i>	Nevin's barberry	CATEGORY 1	ENDANGERED	Sandy to gravelly soils, washes below 650 m south western CA
<i>Blennosperma bakeri</i>	Sonoma sunshine	ENDANGERED	ENDANGERED	Vernal pools, wet grasslands below 100 m north coast region CA
<i>Brodiaea filifolia</i>	thread-leaved brodiaea	PROPOSED THREATENED	ENDANGERED	Grassland, vernal pools, 60-300 m San Diego Co.
<i>Brodiaea insignis</i>	Kaweah brodiaea	SPECIES OF CONCERN	ENDANGERED	Foothill woodland south Sierra Foothills Threatened by grazing.

Appendix 12-

22-12
cont. a.) What is the basis for finding a "neutral" or "positive" effect of grazing on these species, i.e. what specific studies have been performed to show a neutral effect of grazing on these species. Direct reference or footnotes of the scientific studies used as a basis for these findings would be useful in this regard. Also less use of acronyms and codes would make these tables easier to read.

Please send me a copy of the Final Environmental Impact Statement when it is issued.
Thank you for the opportunity to comment.

Sincerely,

Sveinn Erik Ólafsson



FAX

Letter # 23, page 1

**City of San Diego
Metropolitan Wastewater Department**



**4918 North Harbor Drive #201
San Diego, CA 92106
FAX: (619) 692-4954**



Please deliver to: Mr. Ed Hasty

Organization: Bureau of Land Management

FAX Number: (916) 978-4620 Total pages sent: 7
(Including this one)

Sent by: Larry Wasserman Phone: (619) 692-4944

Date: August 29, 1997

Notes/Comments:



THE CITY OF SAN DIEGO

August 28, 1997

Mr. Ed Hastey, State Director
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95825

Dear Mr. Hastey:

ATTENTION: Rangeland DEIS

The Metropolitan Wastewater Department has a policy to beneficially recycle municipal biosolids (generated from sewage solids). Biosolids are safe and provide organic carbon and nitrogen to amend soils used in agriculture, including forestry. Although not directly in the "Area of Analysis" we offer the following comments with respect to the "Rangeland Health Standards and Guidelines for California and Northwestern Nevada Draft EIS, dated May, 1997".

Specific Comments:

1. Section 2.2 Water Quality - Best Management Practices

The use of biosolids compost as a soil amendment can be useful in areas of re-vegetation projects to reduce non-point source pollution or to control noxious weeds.

2. Section 3.2.3 Range Improvements and Section 3.3.2 Vegetation

Biosolids in the form of dewatered cake or as biosolids compost can provide a soil amendment to assist in restoring perennial grasslands. The primary benefit is that organic matter is added to the soil structure and nutrients are in a slow-release organic form which limits the potential for nitrate pollution of ground water.

To	Initial	Date
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23-1



Metropolitan Wastewater • Public Works

600 B Street, Suite 500 • San Diego, CA 92101-4587
Tel (619) 533-4200 Fax (619) 533-4267

General Comments:

1. In 1990, the US Department of Interior was a member of an Interagency Task Force convened to develop a policy regarding the beneficial use of municipal sewage sludge (biosolids) on federal lands. A copy of the July 2, 1992 Federal Register is attached describing the policy.


As you will note:

"The weight of scientific evidence supports the presumption that beneficial use of sludge that is permitted by EPA or the States and is of such quality to ensure compliance with the permit does not present a significant risk to the environment when appropriately applied to land".

2. Overall, it may be in the best interests of the BLM and the graying permittees, to supplement the volume of forage via biosolids application and graze the same number of cows on fewer acres. This would release lands for other (and perhaps) higher uses without any negative economic impact on the cattle grazing interests.

Thank you for the opportunity to provide these comments. Please call Milton Redick at (619) 533-4227 if you have any questions.

Sincerely,



LARRY WASSERMAN
Environmental Monitoring and Technical Service Division

MDR:nm

Enclosure: FR 30448, July 2, 1992

Mr. Ed Hastey, State Director
Bureau of Land Management
August 28, 1997
bcc

Letter # 23, page 4

T. Alspaugh
A. Beingessner
S. Hamilton
A. Langworthy, MS 45A
M. Redick

Alturas California 96101
8-20-97

Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento Ca., 95825

Dear Members,

24-1 In view of your EIS Draft for Rangeland health Standards.
I'm very supportive of your alternative no. 1 as it allows for
good range management and also allows cattle and livestock
grazing. I believe livestock grazing is beneficial to the
regrowth of good grass and other livestock habitat.

24-2 It also promotes economic benefits to the community and
ranchers, therefor I oppose Guideline # 14 and 15, also no. 4 as
these would have an impact on local communities and economic
values on ranches and businesses.

I believe grazing livestock on BLM lands can be beneficial
to all concerned of rangeland uses such as wildlife, recreation,
good water and also timber.

I believe someone with of at least fifteen years experience
on rangeland use should be the party to value rangeland
conditions.

Lets keep our rural communities alive that depend on federal
lands as part of their ranching values.

Sincerely
Robert Schluter

From: Elizabeth L. Painter <paintere@west.net>
To: ilmCACSO.smtp("jmorriso@ca.blm.gov")
Date: Mon, Sep 1, 1997 12:48 am
Subject: Draft EIS for Rangeland Health Standards & Guidelines for California & Northwestern Nevada

To whom it may concern:

I appologize for the lateness of my comments. Unfortunate family problems have delayed my being aboe to submit these.

I hope that they are not passed the deadline for consideration. The coverletter I received with the draft gave 31 August 1997 as the deadline.

Although this is a sunday of a three-day weekend, and not a work day, I am sending these comments on 31 August 1997, in hopes that you will consider them to be within that deadline. A hard copy of my coments will follow by mail.

I am writing as a concerned member of the public and a professional scientist with both interest and experience with the topic of the Draft

Environmental Impact Statement (DEIS). I have graduate degrees in both botany and range science and have published in professional journals on both topics, including invited papers.

As a matter of professional identification only, I hold research associate appointments at both the University of California at Berkeley (University and Jepson Herbaria) and Colorado State University, and am currently editor of Madrono, the journal of the California Botanical Society. My comments are entirely my own; I do not presume speak for either institution nor for the journal nor society. I am not attaching references. However, I will be glad to provide references scientifc literature that support my comments below.

25-1 Standards and guidelines for grazing managment of BLM lands are long overdue and much needed. When I received this document, I had anticipations. I had hoped that this EIS would supply genuine, measurable standards for range management in California and northwestern Nevada and guidelines for meeting them. I was quite disappointed it does not. The public has limited

25-2 Confidence in government agencies to manage public lands (Brunson & Steel 1994 Rangelands 1994). The public-land livestock industry is perceived as an example of harmful tax-ayer-subsidized resource extraction (Losos et al. 1995) of limited economic importance (Power 1996).

25-3 Public lands support a relatively small proportion of the cattle raised in the United States, or in California and Nevada (Forest & Rangeland Resources Assessment Program 1988, Torell et al. 1992, Power 1996) at high ecological cost (Fleischner 1994, Gillis 1991, Mack & Thompson 1982, Milton et al. 1994, Painter 1995). Therefore, it behooves the BLM to provide genuine quantifiable standards and guidelines to acheive their goals.

25-4 [The DEIS should be quantifiable standards for each significant soil type, for each vegetation type including (but not limited to riparian areas and wetlands), and for each special status species. There should be concise guidelines for each of these.

25-5 [There needs to be at least a brief discussion of each technique to be used, with a monitoring plan and schedule. There needs to be a clear implementation plan, with schedules for management

25-6 [change on allotments where there is known grazing damage, identified by resources area.

25-7 [Instead of the clear, concise, quantifiable standards and guidelines needed for ecologically sound management, the EIS depends upon vague statements that are closer to goals than standards and guidelines for meeting those goals.

25-8 [The DEIS (p. 4) defines 'standard' as "a criterion...upon which a judgement or decision is based...[that] is measureable...." By that definition, there are few 'standards' in any of the alternatives in the EIS, since the 'standards' given under each alternative are not measurable.

25-9 [Time does not allow me to go into detail as to why most of the 'standards' are not measurable as written. There is a heavy dependence on "sufficient", which is not defined in any measurable way. For example, what constitutes "sufficient" ground cover to protect sites from accelerated erosion? How is it quantifiable? What are the guidelines for this"? Also, how does one know when biological soil crust are appropriate? How does one measure "appropriate"? Unfortunately, these types of vague, nonquantifiable statements are not substitutes for genuine standards.

25-10 [There are even fewer 'guidelines', as defined by the DEIS on p. 4. What are the criteria for deciding if a grazing system is compatible with the persistence of desired species? What are those desired species? What are the criteria for deciding if a species is desirable or not? How will it be quantified if grazing management practices are allowing for the reproduction of species that maintain riparian-wetland function?

25-11 [One of the few quantifiable standards presented in the EIS is the use of residual dry matter (RDM). RDM monitoring has limited predictive powers (Vallentine 1990). RDM method was designed for use on private land with alien annual grasslands, to maximize livestock production. It is inappropriate for many vegetation types and it should not be used as a substitute for monitoring that is designed to protect natural resources and special status species.

25-12 [There needs to be a protocol included in the DEIS for measurement of RDM (and all other quantifiable guidelines).

I am aware that a number of conservation and public service

- organizations
(including California Native Plant Society) have been working with government agencies to help develop quantifiable standards and guidelines.
- 25-13 It would have been little more work than what went into this document to adapt these standards and guidelines for Alternatives 2 (statewide consistency) and 4 (rapid improvement/rapid recovery) or to advise RACs on how to adapt them for their areas (Alternative 1). Since there are regulations in place, measurable standards should be available for them. These should have been spelled out in detail, along with appropriate guidelines.
- 25-14 The alternatives contain no specific quantifiable guidelines as to what will actually instigate management changes in the field. There are no provisions such as "if bare soil exceeds an average of 5% in a pasture, grazing use will cease" or "if browse damage of riparian woody indicator species exceeds 5% grazing will cease". Instead, what is provided are vague, unmeasurable goals.
- 25-15 There are no monitoring plans of any kind in the DEIS. Even the best standards will not produce change without careful, appropriate monitoring.
- 25-16 Although the DEIS points out that there is livestock-related ecological damage on BLM lands, it provides no list of priority allotments nor any plans for management change. Specific plans for identified allotments, with actions and time projections, is essential to meet the stated goals.
- 25-17 The evaluation of current ecosystem condition in chapter 3 is subjective and inadequate. It includes very little quantitative information on soil conditions, weed infestations, riparian physical and biological condition, etc. It does not reference any of the documents available on the condition of special status species, including US Fish and Wildlife Service findings and the numerous studies that have been done on these species (many funded by BLM).
- 25-18 The DEIS does not include information about numbers of acres or allotments that have been surveyed for weeds nor for rare and endangered species. The most recent data available to me indicate that there are large gaps in BLM data, but the DEIS does not include a plan to fill those gaps.
- 25-19 The DEIS has no program to survey for nor eradicate alien weeds. In fact, BLM appears to be specifically managing for the maintenance of a vegetation type dominated by alien biologically weedy (sensu Baker 1974) plant species
-- Mediterranean-annual-dominated grasslands.
- 25-20 Appendix 11 does not correspond with special status plant species lists that can be found in NEPA documents for subunits within the

25-20
cont. area covered by the DEIS. The former should be a subset of the latter. The DEIS should have an explanation why there is a discrepancy.

Appendix 11 defines 'positive' effects on special status plant species only in terms of supposed benefits from reduction in residual dry matter and presumed reduction in competition from annual grasses. This definition assumes that reduced residual dry matter in fact is beneficial to all special status plant species and that there is reduced competition from annual grasses and that such competition is in fact limiting.

25-21 The best available scientific literature includes many cases where litter and/or standing dead biomass are in fact important to plants and that reduced amounts has negative impacts to those plants. Thus, it needs to be demonstrated that the special status plant species on the list do better with reduced litter and standing dead biomass than they do with the material in place. To simply assume this without specific data, assuming a 'benefit' just wishful thinking, which is a very poor basis for management decisions.

Van Dyne & Heady (1965) pointed out that livestock generally do not preferentially feed on alien annual grasses. Only by such preferential feeding on the alien annual grasses and preferential avoidance of the special status species would livestock grazing lead to a significant shift in competition. Therefore, it needs to be quantifiable demonstrated that such differential use does occur in the habitats of each special status plant species and that there is a statistically correlated increase in the numbers of the special status species. Without these data, simply declaring a 'benefit' can only be wishful thinking. Management decisions for federally and state listed species should be based on best available science.

25-22 The DEIS needs to consider all possible impacts of livestock (both direct and indirect) when considering whether impacts are negative, positive, or neutral, including (but not limited to) defoliation, pull-up, trampling, soil compaction, damage to mycorrhize, damage to cryptobiotic crust, damage to nurse plants, and changes in nutrient cycles and continual export of nutrients. For example, Taylor and Davilla 1986) included loss of cryptobiotic crust and associated increases in weedy alien annual grasses as a negative impact of livestock to *Caulanthus californicus*.

25-23 Statements in Appendix 11 concerning effects of livestock grazing under current management on the special status plant species are contradicted by reports for species on this list I was able to quickly review, including *Caulanthus californicus* (Taylor & Davilla 1986; Mazer & Hendrickson 1993), *Eremalche kernensis* (Taylor & Davilla 1986; Mazer, LeBuhn, & Meede 1993),

25-23
cont.

Eriastrum hoover (Taylor & Davilla 1987), and Lambertia congdonii (Taylor 1987; Mazer & Hendrickson 1993). These call into question the rest of the purported effects. The DEIS needs to cite all available research and/or monitoring data for each species and state whether those data provide evidence for negative, positive, or neutral effects. The current information is meaningless and misleading.

Thank you for your consideration of these comments and concerns.

Elizabeth L. Painter, Ph.D.
2627 State Street N2
Santa Barbara, CA 93105
(805) 687-6187

From: paula schiffman <hcbio019@email.csun.edu>
To: ilmCACSO.smtp("jmorriso@ca.blm.gov")
Date: Sun, Aug 31, 1997 9:00 pm
Subject: DEIS: rangeland health...

To:
Rangeland Health Coordinator
BLM, State Office
2135 Butano Dr.
Sacramento, CA 95825-0451

This email contains my comments regarding the BLM's draft EIS, "Rangeland Health Standards and Guidelines for California and Northwestern Nevada." I will send a paper copy of these same comments by mail.

26-1

1. It has always been my understanding that, to be effective, an EIS should be as detailed and focused as possible. Otherwise, an EIS is completely worthless as a predictor or environmental impacts. I found this DEIS to be lacking in detail and focus, and, instead, to be full of imprecise statements, broad generalities and "weasel words." Moreover, it reads more like a very vague management plan than a statement of specific environmental impacts that grazing has had and may continue to have on BLM-managed lands. This is extremely troubling. The lands under consideration cover a very broad and varied geographic area and support an enormous diversity of organisms, ecosystems and ecological processes. Some of the species native to these lands are listed as threatened or endangered (e.g. giant kangaroo rat, blunt-nosed leopard lizard, San Joaquin kit fox, *Caulanthus californica*, *Eriastrum hooveri*, *Lembertia congdonii*, etc... etc...). Moreover, several of the communities are in danger of extinction (e.g. California valley grassland and spiny saltbush scrub). This DEIS does not come close to doing justice to the land or the organisms and ecosystems that occupy them. Because of the degree of imprecision, I find this DEIS to be completely unacceptable.

26-2

According to sections 1.1 and 1.2, this DEIS is being prepared because of congressional mandate and a directive from the Secretary of the Interior to regulate grazing and to preserve public lands. Presumably, the EIS will serve as a legal document and as the basis for management decisions. Because the language in it is so vague, it is my opinion that this document is just a giant loophole. For example, what exactly is meant by the following statements and terms?

"... sustaining the capacity of rangeland to satisfy values and produce commodities."
(Chapt. 1, p. 3)

"...ecosystem position, resource risk, biological values..."
(Chapt. 2, p. 3)

"A. Watersheds are properly functioning; B. Ecological processes are in order;...

D. Habitats of protected species are in order." (Chapt. 2, p. 5 and p. 12)

"Precipitation is able to enter the soil surface at appropriate rates..." (Chapt. 2, p. 6)

"Native or other desirable plant [sic] and animals are diverse, vigorous..."

"Levels of non-native plants and animals are at acceptable levels"

"Special status species are healthy..." (Chapt. 2, p. 7)

"Where appropriate, species composition contributes to the desired plant community objectives."

"...significant progress toward functioning properly and achieving an advanced ecological status." (Chapt. 2, p. 8)

26-2
cont.

"Aquatic organisms and plants (e.g. macroinvertebrates, fish, algae and plants) indicate support for beneficial uses" (Chapt. 2, p. 9)

"All waters are suitable for original use or desired beneficial use." (Chapt. 2, p. 20)

"Any riparian or wetland areas in functioning-at risk or nonfunctional condition must be in an upward trend." (Chapt. 2, p. 25)

What is meant by words and phrases such as: "appropriate," "vigorous," "healthy," "sufficient," "desired," "functioning properly," "nonfunctional condition," "advanced ecological status," "beneficial uses" "original use" "upward trend"? How does the "knowledgeable BLM staff" (Chapt. 2, p. 5) identify and evaluate the conditions described by these words and phrases?

26-3

2. Given the importance of this document, I was disturbed to read (Chapt. 5, p. 2) that "formal consultations" were not held with several presumably interested state and federal government agencies. At a minimum formal consultations should have been pursued with the US Fish and Wildlife Service and the California Department of Fish and Game. Actually, I find it quite remarkable that absolutely no formal consultations regarding this DEIS were sought out and that only a few "informal consultations" were done. Why weren't comments solicited in a proactive way from organizations such as the Sierra Club and the Audubon Society? Why weren't scientists consulted regarding policies that rely on scientific information? I am a Ph.D. scientist, a California State University professor and have been actively engaged in ecological research at the Carrizo Plain Natural Area (one of the BLM's largest non-desert holdings in California). Yet, until about one week ago I was completely unaware of this DEIS and had not been invited to "scope it" by

26-4

26-4
cont.

any BLM personnel. I only received a copy of the DEIS in late August 1997 when Emily Roberson (California Native Plant Society) requested that I be invited to make comments. Why didn't the BLM pursue comments from me and other scientists known to have expertise in this region (at U.C. Berkeley, U. C. Davis, Cal Poly San Luis Obispo and elsewhere)? Although the DEIS states that the BLM sent out news releases and letters to "potentially interested parties," it is obvious that the "scoping" efforts were far from adequate. It certainly appears as if the BLM is trying to "pull a fast one." The very large number of scoping omissions seem quite telling.

26-5

3. What is the logic behind allowing grazing in or near riparian ecosystems? The detrimental effects of cattle on riparian areas is well known (erosion, water pollution, etc). Moreover, most knowledgeable people agree that California's riparian systems are endangered (see Warner, R. E. and K. M. Hendrix (eds). 1984. California Riparian Systems: Ecology, Conservation and Productive Management. University of California Press). Why isn't the book edited by Warner and Hendrix cited in this DEIS? This is a glaring omission!

26-6

4. Chapter 3 includes a brief discussion of the climate in the region and a few average annual rainfall amounts are listed (for Los Angeles, San Francisco and Crescent City -- 3 locales where grazing is a non-issue!). It should be prominently noted that average annual rainfall is a very poor descriptor of the rainfall in the region under discussion. This is because of the very large amount of year-to-year variability in precipitation. In Bakersfield, for example, rainfall since 1954-55 has averaged 15.01 cm per year (July - June). But, in 1971-72 rainfall totaled only 7.62 cm. The following year, nearly three times that amount (20.32 cm) was received at the same location. In fact, since 1954-55 there has not been a single year in which 15 cm of rain has fallen in Bakersfield! Moreover, rainfall varies considerably within a given rainy season. Rain might fall steadily for 3 or 4 months, as it did in Bakersfield in 1991-92, or it might be largely restricted to a single month (e.g. 11 cm of rain fell in Bakersfield in March 1991). Still another point that should be emphasized is the large difference in the amounts of precipitation received by areas categorized as California prairie (or valley grassland or annual grassland). For example:

26-7

LOCATION	JAN. AVG (S.E.)	FEB. AVG (S.E.)	ANNUAL AVG (S.E.)
Bakersfield	2.43 cm (0.28)	2.75 cm (0.41)	15.01 cm (0.86)
Delano	3.19 cm (0.43)	3.38 cm (0.50)	18.65 cm (1.17)
Coalinga	4.34 cm (0.64)	4.18 cm (0.60)	20.87 cm (1.40)
Fresno	5.31 cm (0.69)	4.87 cm (0.65)	27.89 cm (1.78)
Merced	5.89 cm (0.69)	5.37 cm (0.60)	31.04 cm (1.82)
Sacramento	9.78 cm (1.06)	7.51 cm (0.96)	44.61 cm (2.78)
Willows	10.09 cm (1.18)	7.91 cm (0.91)	46.14 cm (2.78)

(these data were extracted from NOAA publications)

26-8

The unpredictability in rainfall and the large geographical differences in the amounts received strongly suggest that management of lands in this region is difficult and requires caution and a long-term perspective. Management decisions based on 1 or 2 years worth of information may turn out to be hasty and problematic. In addition, the rainfall data suggest that, in decision making, the extrapolation of a few small studies to the entire region is probably a bad idea. Simply put, it is unlikely that the native organisms and natural ecological processes that occur in the southern San Joaquin Valley (e.g. Bakersfield or Coalinga) have much resemblance to those of the Sacramento Valley. Grazing in the San Joaquin Valley is likely to have radically different ecological impacts than grazing in the Sacramento Valley.

26-9

5. This DEIS should state clearly that the ecosystems in California grazed today by cattle and sheep had never been grazed historically by large native herbivores (see Painter, E. L. 1995. Threats to the California flora: ungulate grazers and browsers. Madrono 42:180-188. -- again, why wasn't this important citation mentioned in the DEIS?). Cattle and sheep are not surrogates for native grazers like pronghorn antelope and tule elk. Their ecologies are enormously different. In fact, it should be noted that rabbits, gophers, kangaroo rats and other small herbivores are capable of removing a great deal of biomass in California's grasslands.

26-10

6. The discussion of "annual grasslands" in Chapter 3 has a relatively lengthy discussion of the importance of native perennial bunchgrasses such as *Nassella pulchra*. The basis for the idea that perennials grasses once dominated is extremely tenuous, however. Had scientists such as myself or Dr. Elizabeth Painter (U.C. Berkeley's Jepson Herbarium) or Dr. Jon Keeley (Occidental College/National Science Foundation) been consulted about this topic, a radically different (and more comprehensive) view of the historical species composition of this vegetation type would have been readily apparent. For example, this ecosystem is habitat to several hundred different native annual forb species. How might the grazing management plan discussed in this DEIS affect this incredible forb diversity. Does grazing affect these native annual forbs in the same way that it affects alien annual grasses? or native perennial bunchgrasses? Hmmm...

26-11

26-12

7. This DEIS ignores a fairly extensive body of research literature on California vegetation, grazing, wildlife, etc... Are the BLM's scientists and managers familiar with the information that's available? If so, it is not apparent from this DEIS.

26-13

8. Had the writing of this DEIS been more precise and detailed and less vague, the issues and questions that I have mentioned here would have been readily apparent. Moreover, it would have been obvious that the BLM-managed lands in California and

26-13
cont.

northwestern Nevada cover too much terrain and support too much valuable biodiversity to be adequately discussed in a single short EIS... It is my professional opinion that acceptance of this deficient DEIS could likely lead to disastrous management decisions with potentially irreversible consequences (extinctions!).

The above comments were made by:

Paula M. Schiffman, Ph.D.
Associate Professor of Biology
California State University, Northridge
Northridge, CA 91330-8303 voice: 818-677-3350 fax: 818-677-2034
email: paula.schiffman@csun.edu

cc: Dr. Emily Roberson (California Native Plant Society)

CC: ilmCACSO.smtp("emilyr@abacus.com")



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

AUG 27 1997

Jim Morrison
Rangeland Health Coordinator
ATTN: Rangeland DEIS
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA. 95825

Dear Jim Morrison:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the project entitled **Rangeland Health Standards and Guidelines for California and Northwestern Nevada**. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

In 1993, the Bureau of Land Management (BLM) initiated an effort, known as "Rangeland Reform 94," to better enhance the environmental health of public rangelands. As a result of the "Rangeland Reform 94" effort, the Secretary of the Interior issued a final rule for Grazing Administration, on February 22, 1995, that became effective August 21, 1995. Section 4180.2 of this rule requires the BLM State Directors to develop state or regional standards and guidelines (S&Gs) for grazing administration in consultation with BLM Resource Advisory Councils (RACs), other agencies, and the public. This EIS evaluates the S&Gs developed for grazing administration on public lands managed by the California State Office of BLM, exclusive of the California Desert District, and to incorporate these S&Gs into existing land use plans. The proposed standards and guidelines are designed to provide a framework in which BLM and its stakeholders can cooperate to achieve a balance of sustainable development and multiple use, and help progress toward maintaining or attaining healthy, properly functioning rangelands.

The EIS describes and evaluates four alternatives:
Alternative 1, Proposed Action - Standards and Guidelines proposed by the Bakersfield, Ukiah, and Susanville Resource Advisory Councils. Each RAC developed and recommended S&Gs for the specific BLM Resource Areas under their jurisdiction. Implementation would take place over 15 years.
Alternative 2 - State-Wide Consistency/Consolidated Standards and Guidelines. Standards to be applied state-wide are proposed for soils, riparian and wetland areas, species habitat, and water quality. The guidelines and preambles identified by each

RAC under Alternative 1 remain the same with a few exceptions. Implementation would take place over 15 years.

Alternative 3 - No Action (Fall-back Standards and Guidelines from the Regulations published on February 22, 1995). After February 12, 1997, the S&Gs identified in the regulations became effective until the State or regional S&Gs are developed and implemented. If there is no action, these S&Gs would remain in effect.

Alternative 4 - Rapid Improvement/Rapid Recovery Standards and Guidelines. This alternative would ensure that any identified problems are corrected as fast as possible rather than taking a gradual, incremental, approach. Implementation would be more aggressive with a goal of implementation within 5 years. The goal is to promote sharp improvement in trend toward rangeland health within one to three years in favorable sites. This alternative would require a significant increase in BLM staff and funds.

Alternative 1-3 were developed with the assumption that BLM resources would remain the same.

27-1

We applaud BLM's commitment and determination to move towards ecosystem management and the rapid implementation of S&Gs to maintain and achieve healthy, properly functioning rangelands. We are greatly encouraged by the increased attention on specific rangeland health criteria such as the degree of soil stability and watershed function; integrity of ecosystem processes, cycles and flows; water quality; and habitat. We note that more than 69% of stream habitat (wetland/riparian/aquatic) in the EIS area is in a functional-at-risk or non-functional condition due to degradation (Chapter 3, Pg. 52). It is obvious that declining riparian and rangeland conditions mandate tangible change. We strongly support the requirement for corrective action prior to the next grazing season (43 CFR 4180.2(c)). All areas identified to be severely degraded or non-functional should be addressed immediately. We also applaud the strong commitment to a collaborative, community-based management approach. We urge BLM to use every opportunity and tool; such as fee incentives, restricted use of sensitive sites, and use of ecosystem-based approaches; to encourage sound environmental and ecosystem stewardship.

27-2

We note that the DEIS focuses on the approval and evaluation of the S&Gs with minimal description or evaluation of implementation or monitoring requirements and target time frames. Successful achievement of sustainable development, multiple use, and healthy, properly functioning rangelands; depends upon strong linkages between S&Gs, implementation, and monitoring and the simultaneous application of each. Adaptive management will also be a critical component of any successful rangeland management approach, given the absence of inventory data and the evolving science of ecosystem management. We strongly recommend the FEIS provide an expanded and more detailed description of implementation, monitoring, and adaptive management measures and tools. Proposed target time frames for these components of the program should be identified. Monitoring should include implementation, effectiveness, and trend monitoring.

27-3

EPA is also very concerned with the water quality implications of the proposed action (Alternative 1, RACs S&Gs) and other alternatives, and the lack of a cumulative impact analysis. Because of these and the above concerns, we have classified this

27-3
cont.

DEIS as category EC-2, Environmental Concerns - Insufficient Information (see attached "Summary of the EPA Rating System"). We believe changes to the proposed action or selection of an alternative which uniformly and more aggressively addresses all rangeland health criteria throughout the project area are necessary to adequately protect the environment. Our detailed comments are enclosed.

27-4

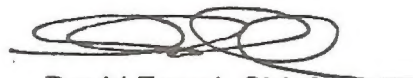
We understand that the DEIS is programmatic, addressing environmental consequences that are correspondingly broad in scope. It is therefore critical that subsequent actions be adequately addressed in tiered NEPA documents. We urge BLM to explicitly commit to tiered NEPA evaluations in their Record of Decision. Clear guidance on the level of NEPA analysis for specific types of tiered actions would be useful.

27-5

Given the geographical extent and significant implications of the proposed management framework, it is critical that Federal, State, and local agencies and the public be given ample opportunity to evaluate and discuss the final decision as stated in the Final EIS (FEIS). Therefore, we strongly recommend that the BLM issue the FEIS for a minimum of 30 days prior to issuing a signed Record of Decision (ROD).

We appreciate the opportunity to review the DEIS. Please send us two copies of the Final EIS at the same time it is officially filed with HQ EPA. If you have any questions, please call me at (415) 744-1584, or Laura Fujii, of my staff, at (415) 744-1579.

Sincerely,



David Farrel, Chief
Federal Activities Office

Enclosure: Detailed Comments, 3 pages
EPA Rating Summary
EO on Environmental Justice

Filename: ranges&g.dei
MI002656

cc: US Fish and Wildlife Service
US Forest Service
National Marine Fisheries Service
California SWRCB
California Native Plant Society

COMMENTS

Water Quality

EPA questions the ability of the proposed alternatives to ensure that water quality complies with State water quality standards as required by Section 4180.1 of the Grazing Administration Regulations. The DEIS clearly states that specific standards for water quality under Alternative 1 RAC's S&Gs are contrary to the State's requirements and therefore cannot be implemented by BLM. For instance, the Ukiah RAC standard for water quality provides for an exception to meeting state standards for off-stream artificial impoundments (Chapter 4, pg. 27). The Susanville RAC standard for water quality is also very general and does not specifically address water quality standards.

27-6

We are also extremely concerned that Alternative 2 State-Wide Consistency does not specifically address meeting State water quality standards (Chapter 4, pg. 27). Instead, this alternative relies upon working with the State of California and the Regional Water Quality Control Boards to revisit the Basin Plans and make new determinations of the beneficial uses and new water quality standards. As clearly described in the DEIS, there is a pressing need to address the high percentage of stream habitat in functional-at-risk and non-functional condition. Revisiting the Basin Plans and redetermining beneficial uses and water quality standards, may represent an unacceptable delay to critically needed remedies to water quality impaired habitats.

We strongly urge BLM to ensure that the selected alternative specifically addresses State water quality standards consistently throughout the region. One option is to adopt the water quality standard and guidelines proposed for Alternative 4. Further work with the State of California and Regional Water Quality Control Boards on their Basin Plans, beneficial uses, and water quality standards can take place simultaneously with immediate implementation of specific S&Gs and management actions to address critical water quality problems.

27-7

To minimize adverse impacts due to oversight and to capture all opportunities to improve water quality, both standards and guidelines should specifically provide for grazing management actions that enhance water quality. Specific examples of management practices should be listed. We recommend adoption and/or utilization of the National Resources and Conservation Services' Field Office Technical Guides and the California and Nevada Best Management Practices for water quality as outlined in Appendices 8 and 9.

Alternatives

27-8

Given the critical need for immediate action to improve rangeland health, EPA believes the selected alternative should ensure consistent and aggressive management actions throughout the project area. While we support an aggressive management approach to identified problems, we recognize the significant limitations and constraints regarding staffing and funding. Thus, we strongly recommend BLM consider an alternative which combines critical components of Alternative 1, 2, and 4. For example, the selected alternative should provide state-wide consistency, integrate the commendable work and recommendations of the RACs (e.g. preambles and selected S&Gs such as utilization guidelines), and incorporate some of the more specific and aggressive S&Gs of Alternative 4; especially for water quality, riparian, and wetland habitats.

Monitoring

27-9

Monitoring and evaluation of habitat trends is a critical component of a successful rangeland management system. To ensure consistent and clear direction for on-the-ground implementation and monitoring, EPA strongly recommends guidance be provided to the field on how to adequately integrate and link the historical Allotment Priority Categorization system (I,M,C, U designations), the new S&Gs, and the rangeland health requirements.

Cumulative Impacts

27-10

The National Environmental Policy Act specifically states that the EIS should include discussions of the direct, indirect, and cumulative effects which are caused by the action [40 CFR Section 1502.16]. Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions [40 CFR Section 1508.7]. We note that the DEIS has failed to fully evaluate cumulative impacts. It is our understanding that BLM is aware of this oversight and will include such an evaluation in the FEIS. To ensure an adequate cumulative impact evaluation, we recommend BLM take a big picture, regional, and landscape approach which considers probable cumulative impacts and ecosystem trends of public (e.g., US Forest Service) and private rangeland management systems, recreation, mining, and other land management activities (e.g., residential development, fish and wildlife restoration efforts, Comprehensive Resource Management Plans, Biodiversity Council actions, PACFISH, NW Forest Plan). It is understood that such an approach is necessarily broad and will not be able to provide a

27-10
cont.

specific quantitative cumulative impact analysis.

Environmental Justice

27-11

In keeping with Executive Order 12898, **Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations** (EO 12898), the FEIS should describe the measures taken by BLM to: 1) fully analyze the environmental effects of the proposed Federal action on minority communities, e.g. Indian Tribes, and low-income populations, and 2) present opportunities for affected communities to provide input into the NEPA process. The intent and requirements of EO 12898 are clearly illustrated in the President's February 11, 1994 Memorandum for the Heads of all Departments and Agencies, attached.

General

27-12

1. The Table of Contents identifies Alternative 2 as the No Action alternative and Alternative 3 as the State-Wide Consistency alternative. Chapter 2 which describes the alternatives in detail, describes Alternative 2 as the State-Wide Consistency alternative and Alternative 3 as No Action. The FEIS should correct this inconsistency.
2. We recommend a glossary of acronyms be added to the FEIS.

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommend for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

THE WHITE HOUSE

WASHINGTON

February 11, 1994

MEMORANDUM FOR THE HEADS OF ALL DEPARTMENTS AND AGENCIES

SUBJECT: Executive Order on Federal Actions to Address
Environmental Justice in Minority Populations
and Low-Income Populations

Today I have issued an Executive order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. That order is designed to focus Federal attention on the environmental and human health conditions in minority communities and low-income communities with the goal of achieving environmental justice. That order is also intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority communities and low-income communities access to public information on, and an opportunity for public participation in, matters relating to human health or the environment.

The purpose of this separate memorandum is to underscore certain provision of existing law that can help ensure that all communities and persons across this Nation live in a safe and healthful environment. Environmental and civil rights statutes provide many opportunities to address environmental hazards in minority communities and low-income communities. Application of these existing statutory provisions is an important part of this Administration's efforts to prevent those minority communities and low-income communities from being subject to disproportionately high and adverse environmental effects.

I am therefore today directing that all department and agency heads take appropriate and necessary steps to ensure that the following specific directives are implemented immediately:

In accordance with Title VI of the Civil Rights Act of 1964, each Federal agency shall ensure that all programs or activities receiving Federal financial assistance that affect human health or the environment do not directly, or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin.

✓ Each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. section 4321 et seq. Mitigation measures outlined or analyzed in an environmental assessment, environmental impact statement, or record of decision, whenever feasible, should address significant and adverse environmental effects of proposed Federal actions on minority communities and low-income communities.

✓ Each Federal agency shall provide opportunities for community input in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of meetings, crucial documents, and notices.

✓ The Environmental Protection Agency, when reviewing environmental effects of proposed action of other Federal agencies under section 309 of the Clean Air Act, 42 U.S.C. section 7609, shall ensure that the involved agency has fully analyzed environmental effects on minority communities and low-income communities, including human health, social, and economic effects.

Each Federal agency shall ensure that the public, including minority communities and low-income communities, has adequate access to public information relating to human health or environmental planning, regulations, and enforcement when required under the Freedom of Information Act, 5 U.S.C. section 552, the Sunshine Act, 5 U.S.C. section 552b, and the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. section 11044.

* * *

This memorandum is intended only to improve the internal management of the Executive Branch and is not intended to, nor does it create, any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any person.

William D. Clement



DEPARTMENT OF ADMINISTRATION

Capitol Complex
Carson City, Nevada 89710
Fax (702) 687-3983
(702) 687-4065

August 21, 1997

Mr. Jim Morrison
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95825-0451

Re: SAI NV # E1997-144

Project: Draft EIS for Rangeland Health Standards and
Guidelines for California and Northwestern Nevada (1610; CA-
930.8)

Dear Mr. Morrison:

Thank you for allowing the State of Nevada the opportunity to comment on the Draft Environmental Impact Statement (EIS) for *Rangeland Health Standards and Guidelines for California and Northwestern Nevada*. As the enclosed comments from the Nevada Division of Wildlife, the Commission for the Preservation of Wild Horses, and the Division of Conservation Districts will show, the State of Nevada has several concerns about the content and methodology used for this draft EIS. The exclusion of wild horse and burro herds from analysis in this draft EIS is a large oversight and should be corrected in the final EIS. Also, in order to conduct a useful analysis, the BLM must use the most current, scientifically sound data. Without such data, it is difficult to develop any meaningful Standards and Guidelines.

We hope you will find these comments useful as you develop the final EIS. We look forward to reviewing the final document when it becomes available. Please call me if you have any questions at (702) 687-6367.

Sincerely,

A handwritten signature in cursive script that reads "Julie Butler".

Julie Butler, Coordinator
Nevada State Clearinghouse/SPOC

Enclosures

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NEVADA STATE CLEARINGHOUSE

Department of Administration
Budget and Planning Division
Blasdel Bldg., Rm. 200
(702) 687-4065
fax (702) 687-3983

Letter # 28, page 2

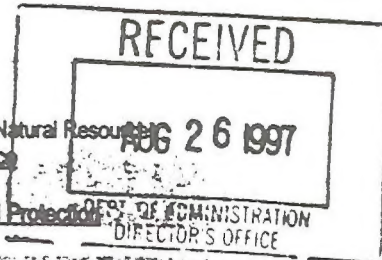
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DATE: June 3, 1997

Governor's Office
Nuclear Projects Office
Business & Industry
Agriculture
Energy
Minerals
Economic Development
Tourism
Fire Marshal
Human Resources
Aging Services
Health Division
Colorado River Commission
Indian Commission

Legislative Counsel Bureau
Communications Bd.
Emp. Training & Rehab Research Div.
PSC
Transportation
UNR Bureau of Mines
UNR Library
UNLV Library
Wild Horse Commission
Historic Preservation
Emergency Management
Washington Office

Conservation-Natural Resources
Director's Office
State Lands
Environmental Protection
Forestry
Region 1
Region 2
Region 3
Conservation Districts
State Parks
Water Resources
Water Planning



Nevada SAI # E1997-144

Project: DEIS - Rangeland Health Standards and Guidelines for California and Northwestern Nevada

☒ Yes ☐ No Send more information on this project as it becomes available.

CLEARINGHOUSE NOTES:

See Related SAI # E1997-028, 94300088, 94300036 & 94300107.

Please note that if you do not wish to retain a copy of this document for your files, please recycle or discard it.

Enclosed, for your review and comment, is a copy of the above mentioned project. Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than August 27, 1997. Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. If you have any questions, please contact Terri Rodefer, Clearinghouse Environmental Advocate, at 687-6382, or Julie Butler, Clearinghouse Coordinator, at 687-6367.

THIS SECTION TO BE COMPLETED BY REVIEW AGENCY:

- | | |
|--|---|
| <input type="checkbox"/> No comment on this project | <input type="checkbox"/> Conference desired (See below) |
| <input type="checkbox"/> Proposal supported as written | <input checked="" type="checkbox"/> Conditional support (See below) |
| <input type="checkbox"/> Additional information below | <input type="checkbox"/> Disapproval (Explain below) |

AGENCY COMMENTS:

We request that the final EIS more fully discuss the likely effects that the various alternatives may have on the further introduction and/or spread of noxious weeds and other exotic species into remaining native-dominated rangelands throughout the analysis area, and the practices that should be adopted to minimize such effects.

James D. Morefield
Signature

Natural Heritage
Agency

22 Aug. '97
Date

NEVADA STATE CLEARINGHOUSE

Department of Administration
Budget and Planning Division
Blasdel Bldg., Rm. 200
(702) 687-4065
fax (702) 687-3983

DIVISION OF

JUN 04 1997

DATE: June 3, 1997

CONSERVATION DISTRICTS

Governor's Office
Nuclear Projects Office
Business & Industry
Agriculture
Energy
Minerals
Economic Development
Tourism
Fire Marshal
Human Resources
Aging Services
Health Division
Colorado River Commission
Indian Commission

Legislative Counsel Bureau
Communications Bd.
Emp. Training & Rehab Research Div.
PSC
Transportation
UNR Bureau of Mines
UNR Library
UNLV Library
Wild Horse Commission
Historic Preservation
Emergency Management
Washington Office

Conservation-Natural Resources
Director's Office
State Lands
Environmental Protection
Forestry
Wildlife
Region 1
Region 2
Region 3
State Parks
Water Resources
Water Planning
Natural Heritage

Nevada SAI # E1997-144

Project: DEIS -- Rangeland Health Standards and Guidelines for California and Northwestern Nevada

☐ Yes ☐ No Send more information on this project as it becomes available.

CLEARINGHOUSE NOTES:

See Related SAI # E1997-028, 94300088, 94300036 & 94300107.

Please note that if you do not wish to retain a copy of this document for your files, please recycle or discard it.

Enclosed, for your review and comment, is a copy of the above mentioned project. Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than [redacted] use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. If you have any questions, please contact Terri Rodefer, Clearinghouse Environmental Advocate, at 687-6382, or Julie Butler, Clearinghouse Coordinator, at 687-6367.

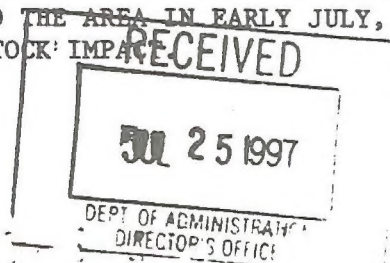
THIS SECTION TO BE COMPLETED BY REVIEW AGENCY:

☐ No comment on this project
☐ Proposal supported as written
☒ Additional information below

☐ Conference desired (See below)
☐ Conditional support (See below)
☐ Disapproval (Explain below)

AGENCY COMMENTS:

1. RECOMMEND THE ADOPTION OF ALTERNATIVE #1 FOR RANGELAND HEALTH STANDARD AND GUIDELINES FOR CALIFORNIA AND NORTHWESTERN NEVADA.
2. RECOMMEND THE STANDARDS AND GUIDELINES BE TESTED IN THE SURPRISE RESOURCE AREA ON THE BARREL SPRINGS ALLOTMENT. IN A VISIT TO THE AREA IN EARLY JULY, THE RIPARIAN CORRIDOR APPEARED TO BE AT RISK BECAUSE OF LIVESTOCK IMPACT.



ick Freeman
Signature

Div of CDS
Agency

7/24/97
Date



COMMISSION FOR THE
PRESERVATION OF WILD HORSES

1105 Terminal Way
Suite 209

Reno, Nevada 89502
(702) 688-2626

July 10, 1997



Ms. Julie Butler
Clearinghouse Advocate
Nevada State Clearinghouse
Blasdel Bldg., Rm. 200
Carson City, Nevada

Subject: Standards and Guidelines DEIS - SAI# 1997-144

Dear Ms. Butler:

The Nevada Commission for the Preservation of Wild Horses has reviewed the Draft Environmental Impact Statement - Standards and Guide for California and Northwestern Nevada. Nevada has approximately four interstate and five resident wild horse herds impacted by livestock grazing within the Susanville District.

28-2 Wild horses were excluded from this draft environmental impact statement. We were disappointed that the Bureau of Land Management did not assess the implementation of these Standards and Guidelines on wild horses. Standards and Guidelines for the Sagebrush Steppe Habitat were intended to establish the limiting factors or resource thresholds that required changes to meet Rangeland Reform. Wild horses adjustments have been the principle management actions to protect resources in Susanville District the past 15 years of land use planning.

Extensive planning efforts have created allotment management plans and grazing systems that were never fully implemented. Wild horse herds have been reduced over 70 percent, resulting in some herds with few as 20 animals. Given the past emphasis to reduce wild horses, it is surprising that the Bureau of Land Management choose not to hold wild horses to the Standards and Guidelines developed by the Resource Advisory Council.

28-3 We were not able to determine the criteria for determining which allotments in Nevada did not meet the fundamentals for range health. The documents did not present a list of the few allotments chosen to implement Range Reform. It is difficult to understand how the implementation of livestock adjustments over one to five

Ms. Julie Butler
July 10, 1997
Page 2

28-3
cont.

years will meet the present federal regulations. While we realize that Bureau of Land Management lacks its desired funding level, we fail to find how the proposed action will require 15 years to achieve land use plan objectives or the Standards and Guidelines.

28-4

In summary, Nevada has not witnessed the evaluation of rangeland monitoring data for allotment specific decisions on the majority of allotments administered by Susanville District. Exhaustive planning efforts and extensive range improvement projects have been applied to a majority of Nevada allotments. While the Standards and Guidelines complement the more specific land use plan objectives, these criteria should now be applied through management actions supported with rangeland monitoring data to promote healthy rangelands. Wild horses should not be excluded from these criteria. More progressive livestock actions may be necessary to meet the Standards and Guidelines in a more timely manner.

Sincerely,



CATEHRINE BARCOMB
Executive Director



BOB MILLER
Governor

Letter # 28, page 6

STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF WILDLIFE
1100 Valley Road
P.O. Box 10678
Reno, Nevada 89520-0022
(702) 688-1500 • Fax (702) 688-1595

PETER G. MORROS
Director
Department of Conservation
and Natural Resources

RECEIVED
JUL 15 1997
DEPT. OF ADMINISTRATION
DIRECTOR'S OFFICE

WILLIAM A. MOLINI
Administrator

Nevada Division of Wildlife
Regional Office 423-3171
380 West B Street
Fallon, Nevada 89406

July 9, 1997

Ms. Julie Butler
Nevada State Clearinghouse
Planning Division
Blasdel Bldg. Room 200
Carson City, Nevada 89710

RE: DEIS Standards and Guidelines - SAI NV# 1997-144

Dear Ms. Butler:

The Nevada Division of Wildlife appreciates this opportunity to comment on the Draft Environmental Impact Statement - Standards and Guidelines for California and Northwestern Nevada. Presently, Nevada has 23 allotments in the Surprise Resource Area and two allotments in the Eaglelake Resource Area administered by the Susanville District. Many of these allotments have been under a formal land use plan for over 15 years. It is our view that Standards and Guidelines should complement these land use plans with more site-specific objectives and responsive management actions to conform with "Range Reform". Since Nevada allotments are within the Sagebrush Steppe Habitat Type, we will limit our comments to those portions of the document relative to Nevada.

CHAPTER 1

Information provided in the background section did not include the Federal Lands Policy and Management Act of 1976. Multiple use mandates of the Act created the present land use plans that are the basis of regulatory changes in Range Reform 94. The Standards and Guidelines should include Wild Horses and Burros. Wild horse populations throughout Nevada require management to achieve a natural ecological balance. Standards should uniformly be applied to all ungulate uses for monitoring studies and future adjustments in Nevada.

Ms. Julie Butler
July 9, 1997
Page 2

CHAPTER 2

28-6

Screening criteria, data and assessments to determine the allotments' conformance to the Standards and Guidelines should be included in this Draft Environmental Statement. Data that determined the actual allotments in need of management actions should be included in this document. Prioritization of allotments was completed in the land use plans. A simple assessment of the existing prioritization and criteria should also be included.

28-7

Implementation of the Standards and Guidelines appear to be limited to the present rule statement: "not later than the start of the next grazing year". It would be consistent to have Guidelines with different options for immediate management actions to comply with this rule.

28-8

Susanville RAC Standards are comprehensive and complement existing land use plan goals, objectives and decisions. However, these Standards are less specific than existing land use plan criteria. For example, allotment final decisions completed in the early 1980's set allowable use levels for key forage species at the "moderate" level or 60% use of annual growth. Threshold stubble height of residual vegetation have been determined, in recent grazing decisions, to be within the range of four and six inches. Grazing decisions, that were based on monitoring studies that found key forage species in need of restoration, determined allowable use levels of 40% use of annual growth. Other examples are found in Guideline 14 that better reflect the existing land use planning. It would appear that these allowable use levels are Standards and management actions required to achieve them should be the Guidelines.

CHAPTER 3

28-9

Monitoring is essential to the implementation of Guidelines. Use pattern mapping data are critical to determine if thresholds are being met. All data must be quantitative to determine if "significant progress" is being made by present management. We agree that averaging key management area and use pattern mapping data should not be used to determine carrying capacities. Statistical data should be provided to prove "significance" as stated in the rules.

Allowable use levels have been established on some Nevada allotments. We would agree that annual precipitation has an effect allowable use levels. However, common practices used to Yield Index the observed utilization data during drought years would be contrary to data displayed in Table 3.2.5.. We suggest

Ms. Julie Butler
July 9, 1997
Page 3

28-9 cont. provisions be made to prohibit Yield Index procedures throughout the Sagebrush Steppe Habitat.

28-10 Ecological Site Inventory is a meaningful monitoring tool to establish trend. This process may be more accurate than the inventories for the original land use plan; However, the two inventories are not comparable. Since the land use plan data are now twenty years old, it would be meaningful to compare range condition data.

28-11 Wild Horses will require frequent gathers to met the Standards and Guidelines. We agree that horse utilize the land differently than livestock. Therefore, special studies will be required to measure each ungulate use and to allocate available forage.

CHAPTER 4

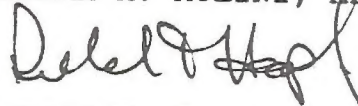
28-12 No data were provided to support the finding that 16% of the allotments are not meeting the fundamentals for rangeland health. We found no listing of criteria to measure the fundamentals. It is unknown what allotments in Nevada are within the Proposed Action.

28-13 We found no data to support the proposed action for livestock use. Phasing in a 9.6 percent livestock reduction in 1-5 years to achieve the Standards within 15 years may be contrary to the stated rules of Range Reform 94.

28-14 It is understandable that funding reductions of the range program could limit monitoring and data assessment as required by regulations. Failure to adequately monitor federal authorizations may then jeopardize continuation of any action. We hope that District's can make the necessary adjustments to implement and achieve the Standards and Guidelines.

Sincerely,

WILLIAM A. MOLINI, ADMINISTRATOR



Richard T. Heap, Jr.
Regional Manager
Region I

CC: Habitat, Reno
Mike Dobel

TO: Ed Hasley, State Director
Bureau of Land Management

SUBJECT: Standards and Guidelines EIS

Dear Mr. Hasley,

Thank you for the opportunity to comment on the Rangeland Health Standards and Guidelines Draft EIS. We have a number of comments we wish to be considered.

29-1

First is the makeup of the Resource Advisory Councils (herein known as RAC's) in terms of members, particularly the Susanville RAC. On page 5-1.5, it states the RAC's are made up of a "cross-section of varying interests in public land management." It should be noted that the makeup of the Susanville RAC is heavily slanted in favor of the livestock industry and its supporters, especially so after you capitulated to the livestock industry and its political supporters and placed three additional members on the Susanville RAC who are ranchers or are pro-livestock bringing the membership from the norm of twelve to a cumbersome fifteen.

This action on your part does a tremendous disservice not only to the concept of the RAC but to the public as well. It ruins the whole concept of balance in terms of interest and gives wildlife, our primary concern, the short end of the stick as happens so often with BLM decisions. The aforementioned "cross-section" is really a cross-section of the livestock industry and its supporters with but a smattering of other affected interests. In order for a RAC to be truly effective, it must be of balanced membership and be able to focus on rangeland health without being constrained to only focus on grazing and its impacts.

29-2

The second comment concerns the total lack of information relevant to the economic value of wildlife and recreation in this document. This severely flaws the entire purpose of the document in that it does not describe in detail other economic values of healthy rangelands. While the livestock economics are described in relative detail, there is no information given regarding the economic value of wildlife and recreation. Both the Calif. Dept. of Fish and Game and the Nevada Dept. of Wildlife have done studies on the economic value of wildlife, hunting and fishing. This important information is easily obtained and should have included in this document.

Third comment. We have always maintained that hunting, fishing and recreation bring in more monies to local economies than the heavily subsidized public land grazing. U.S. taxpayers are losing approximately four dollars for every one dollar the federal government spends on public land grazing. The demographics of the West are rapidly changing and the welfare days for public land grazing are drawing to a close. Recognition must be made of these facts and our lands managed appropriately in accordance with true "multiple use." Wildlife must never again take a backseat to livestock or other interests.

29-3

Fourth comment. The National Environmental Policy Act mandates equal consideration for wildlife when actions are proposed or taken on our public lands. This equal consideration is not being given in this document. Indeed, these Standard and Guideline proposals should have been inclusive of all needs and interests on our public lands- not just for public land grazing.

29-4

After coming to the conclusion that BLM will never conclude this document to be flawed and short-sighted and fails to consider other interests but in the most rudimentary sense, we can not recommend any alternative because of the severe lack of information presented, particularly that which pertains to economics related to hunting, fishing and recreation to mention just a few. We feel that it would be far better to flesh this document out to the extent that it reflects all activities and interests that occur on public lands. Without this critical information, it remains impossible to make accurate, unbiased, and effective decisions. Only when all interests and their activities are studied and assessed can we be able to bring our public lands back to a healthy, viable standard of productivity.

Respectfully submitted;

Wayne Jambois

Wayne Jambois, Spokesman
Organized Sportsmen of Lassen County



Glenn County Board Of Supervisors

Glenn County Board of Equalization
Air Pollution Control District

Courthouse, 526 West Sycamore Street

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Telephone (916) 934-6400 · Fax (916) 934-6419

CHARLES HARRIS, SR.,	District 1
GARY FREEMAN,	District 2
DICK MUDD,	District 3
DENNY BUNGARZ,	District 4
KEITH HANSEN,	District 5
VINCE MINTO,	County Clerk - Recorder

August 25, 1997

Mr. Ed Hastey, State Director
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95835

Attention: Rangeland DEIS

Dear Mr. Hastey:

By direction of the Glenn County Board of Supervisors, I am responding to the Rangeland Health Standards and Guidelines for California and Northwest Nevada Draft EIS.

30-1 [We favor Alternative 1 as described in the DEIS.

As you know, the BLM created three Resource Advisory Councils for the areas in your jurisdiction. These councils included members of the interested public, including members representing elected officials. The elected officials, Bill Maze, Tulare County, Nancy Huffman, Modoc County, and Denny Bungarz, Glenn County, have recommended alternative 1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law, the BLM and has the least negative effect to the cattle industry and the Counties.

Alternative 1 was developed by a group of citizens with varied backgrounds and interest after considerable training on basic ecological processes.

Your favorable consideration of our recommendation is appreciated.

Sincerely,

GLENN COUNTY BOARD OF SUPERVISORS


KEITH HANSEN, Chairman

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California Farm Bureau Federation

1601 Exposition Boulevard • Sacramento, CA 95815 • (916) 924-4000

August 29, 1997

Mr. Ed Hasty, State Director
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, California 95825

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RE: Rangeland DEIS

Dear Mr. Hasty:

The California Farm Bureau Federation is the state's largest agricultural organization representing more than 72,000 member families. While we appreciate the opportunity to comment on the Rangeland Health Standards and Guidelines, we have serious concerns with this proposal and the alternatives offered in the Draft Environmental Statement (DEIS).

31-1

Our first concern relates to the creation of Resource Advisory Councils (RAC's) and their role in drafting the Standards and Guidelines. These councils are compromised of 10-15 people. There is no requirement that a significant number of council members be public lands ranchers. So far the only meaningful activity conducted by the RAC's was the creation of grazing regulations. Since significant representation from public lands ranchers is not a requirement of the RAC's, we are concerned that councils may in the future consist of a majority of anti-grazing members, and not reflect responsible rangeland managers.

31-2

The DEIS outlines several alternatives for the public review process. One alternative is missing, current grazing regulations. Under the current regulations, we have seen tremendous improvement in our rangeland resources. In fact, a 1990 report noted that rangelands nationwide were in the best condition than at any time this century. This trend holds true in California and with the exception of drought impacts, BLM resource lands continue to show steady improvement where grazing occurs. Accordingly, one alternative analyzed in this DEIS should be the current grazing regulations with an emphasis on showing the improvements to resource conditions being made by public lands ranchers.

31-3

We are startled that the best alternative offered in the DEIS, Alternative One is going to result in a significant reduction in Animal Unit Months (AUM's). The analysis used in the DEIS underestimates the long-term effects of this reduction. Ultimately, the loss of AUM's will harm rural communities drastically. This analysis focuses on the impacts to county economies. First, we believe that the analysis conducted does not adequately address these impacts at the county level. In addition, the analysis does not cover the impacts to local towns that will be most affected by a reduction in the grazing AUM's and the corresponding loss of viable ranches. To improve the level of economic analysis, we believe that a private firm should conduct this analysis with input from the agricultural community.

Mr. Ed Hasty, State Director
August 29, 1997
Page Two

31-4

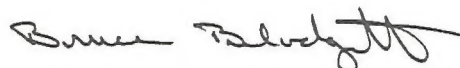
Fewer AUM's will also contribute to the loss of viable ranch operations and the corresponding adverse impact to the environment. For some ranching operations, losing additional AUM's will force these operations out of business. When this happens the base ranches will likely be sold to the highest bidder, typically, development interests. Rangeland conversion to urban uses replaces valuable, productive and scenic rangelands with subdivisions. The end result of lowering the number of AUM's will be a net loss of habitat for species on private lands, for little or no significant improvement in public land resources. The DEIS fails to address this issue.

31-5

A final concern relates to the new requirements for monitoring, if any of the alternatives move forward. We are not concerned that additional monitoring will show adverse conditions; however, we are concerned that the agency will not be able to live up to the new requirements identified in these regulations. We believe that the agency will not have sufficient manpower to complete the additional monitoring requirements. When this happens, the BLM will then be sued by anti-grazing interests who will say that because the agency is unable to abide by the new regulations, that grazing must be stopped until monitoring activities are completed. We have seen this happen in numerous instances and believe that with the new regulations the BLM is destined for failure which ultimately hurts the grazing lands permittees and the resource.

In closing, we would restate that Alternative One is the best option offered to responsibly manage BLM rangelands, but we believe that current grazing regulations are exceptional and are already resulting in the improvement of our resource conditions.

Sincerely,



Bruce Blodgett
Director,
National Affair and Research Division

California Mule Deer Association

1673 Fruitvale Road

Lincoln, CA 95648

916-645-3288



Mr Jim Morrison
California Bureau of Land Management
2135 Butano Drive
Sacramento, California 95825

August 28, 1997

SUBJECT: CALIFORNIA BLM GRAZING STANDARDS AND GUIDELINES DEIS

Dear Jim,

The California Mule Deer Association (CMDA) has reviewed the 1997 Draft Environmental Impact Statement for the California BLM Grazing Standards and Guidelines (DEIS) and provides the following comments:

1. Inadequate Range of Alternatives

32-1

The DEIS provided alternatives which were essentially the same based on their predictable impacts to natural resources. No significantly different wide range of alternatives was developed adequately addressing and discussing different levels of grazing intensity, duration and frequency. Nor were the impacts of such alternatives fully disclosed for the document reader to make a reasonably informed decision as to the merits of the alternatives as to their impacts to resources.

2. No "Rapid Recovery" Alternative Provided in the DEIS

32-2

The DEIS provides no alternative which would result in and aggressive, rapid recovery and maintenance of natural resources to different grazing standards/guidelines.

3. Inappropriate "No Action" Alternative in DEIS

32-3

The DEIS provides an inappropriate "no action" alternative as the alternative does not accurately reflect current management which this alternative is required to.

4. All Alternatives Are Vague and Inadequate in Themselves

32-4

No alternative provides specific, quantifiable standards and guidelines for livestock management. This results in the failure of CA BLM to comply with CFRs and promulgation of Rules addressing this document as found in the Feb. 22, 1995 Federal

Register which clearly obligated BLM to:

- 32-4
cont. a. Develop and implement specific S/Gs
 b. Develop S/Gs which are more specific and detailed than
 state fallback S/Gs.
 c. Provide clear authority and guidance for Range Management

By reviewing all alternatives is quite clear there is no clear guidance, direction, nor specific detailed S/Gs provided the public nor BLM personnel.

5. No Detailed Monitoring Plan Provided in the DEIS

BLM is required, at a minimum, to monitor Proper Functioning Condition of riparian areas via its 1996 interagency agreement with the USFS.

32-5 The DEIS did not provide specific monitoring direction for uplands.

A specific monitoring plan-who, how, where, when- needs to be provide in the DEIS.

6. No Implementation Plan Provided

32-6 DEIS must disclose who will do what, when and how.

7. No Enforcement Plan Provided.

32-7 DEIS does not address nor discuss enforcement and penalties of the non-implementation or compliance of the above plans.

8. No Plan nor Criteria for Allotment Prioritization for NEPA Analysis.

32-8 DEIS must do so.

9. No Alternatives Avoid Season-Long Grazing

32-9 June 1, 1997 satellite transmission by BLM repeatedly acknowledged season-long grazing in riparian and/or uplands as the single most destructive grazing system and clearly not acceptable when developing a compatible grazing system in western rangelands.

10. All Allotments Must Have Interim S/Gs In Place Site-Specific Analysis is Completed.

32-10

32-10 We recommend Susanville District interim Guidelines as general approach

11. All Alternatives Do Not Incorporate State Water Quality Standards.

32-11 Each alternative must comply with state water quality standards and such must acknowledge state water quality standards will be complied with.

Sincerely,

Dano McGinn
President



Cal/EPA

**State Water
Resources
Control Board**

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SEP 5 1997

Mr. Ed Hastey
State Director
Bureau of Land Management
U.S. Department of The Interior
2135 Butano Drive
Sacramento, CA 95825

Dear Mr. Hastey:

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) TITLED
"RANGELAND HEALTH STANDARDS AND GUIDELINES FOR CALIFORNIA
AND NORTHWESTERN NEVADA"

Thank you for the opportunity to review the subject DEIS dated May 1997. Despite the fact that there were no water quality representatives on the Regional Advisory Committees (RACs) that helped prepare the recommendations, I commend your efforts to address issues related to water quality.

The Federal Clean Water Act establishes the context for most of the following comments. As you may know, the main objective of the Act is to "maintain and restore the chemical, physical and biological integrity of the Nation's waters" to the point that they are fishable, swimmable, and drinkable. Our comments are as follows:

1. 33-1 [It is important that rangeland standards affecting water quality be uniform throughout the State. It is recommended that rangeland guidelines affecting water quality also be consistent throughout the State.] It is suggested that targets for mulch management, stubble height, and utilization of desirable plants for upslope and riparian areas be established on a more regional basis.
2. 33-3 [It is highly desirable that the rangeland standards and guidelines be consistent with the Management Agency Agreement (MAA) that we are developing together, with the California Rangeland Water Quality Management Plan certified by the State Water Resources Control Board (SWRCB), and with the Coastal Zone Act Reauthorization Amendments (CZARA) guidelines issued by the U.S. Environmental Protection Agency.]



Pete Wilson
Governor

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Our mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.

Mr. Ed Hastey

-2-

SEP 5 1997

3. The riparian standards proposed by the Bakersfield and Ukiah RACs are the most comprehensive and appropriate.
33-4 The proposed Statewide and Rapid Recovery riparian standards, although similar, are less clear and focused.
4. The water quality standards proposed by the Bakersfield and Ukiah RACs are the most comprehensive and appropriate.
33-5 The proposed Statewide and Rapid Recovery water quality standards lack real substance and appear to be inappropriately focused on processes that Bureau of Land Management (BLM) cannot control rather than on things that BLM can actually accomplish.
33-6
5. Based on your DEIS, SWRCB staff prepared a tabular listing of information for consideration of statewide standards for Riparian/Wetland and Water Quality (Enclosure 1) to ensure water body integrity.
33-7 Information relating to Water Quality standards addresses primarily the legal and water column components of integrity; the information relating to Riparian/Wetland standard addresses the remaining aspects.
6. Based on the documents referenced in Item 2 above, SWRCB staff has prepared some considerations for statewide guidelines (Enclosure 2) to ensure water body integrity.
7. For certain situations (particularly those listed in (a) through (c) below), the standards and guidelines should clearly state that the primary land management objective is resource protection rather than livestock grazing if grazing is contributing to the problem. In addition, the Rapid Recovery alternative presented in your DEIS (with consideration of factors presented in the proposed guidelines in Enclosure 2) should be implemented. This limited application of the Rapid Recovery alternative may allow BLM to better focus its efforts on these high priority situations.
33-8



Mr. Ed Haste

-3-

SEP 5 1997

- 33-8
cont.
- (a) where beneficial water bodies have been listed pursuant to Section 303(d) of the Federal Clean Water Act,
 - (b) where habitat is present or has been present for species that are Federally threatened or endangered, proposed, Category 1 and 2 candidates, or other special status, and
 - (c) in riparian, wetland, streamside, and other designated sensitive areas.

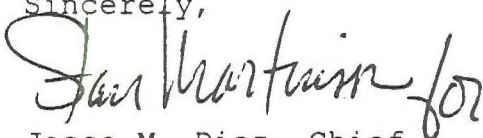
- 33-9
8. Generally, the SWRCB and California Regional Water Quality Control Boards must regulate any activity that discharges or threatens to discharge pollutants into the waters of the State. Water gaps and stream crossings frequently represent a real potential for water quality problems, unless BLM effectively implements best management practices that would significantly reduce that threat.

33-10

In conclusion, I respectfully recommend that you do the following: (1) adopt statewide rangeland standards and guidelines related to water quality and (2) use the SWRCB standards and guidelines information to assist in that purpose.

If you have any questions the staff person most knowledgeable on this issue is Gaylon Lee, and he can be reached at 916/657-0469. You may also call Walt Shannon, Chief of the Nonpoint Source Agricultural Unit, at 916/657-1027.

Sincerely,



Jesse M. Diaz, Chief
Division of Water Quality

Enclosures (2)



Statewide Standards Information for Riparian Areas and Wetlands	
Statement of Standard	Riparian/wetland vegetation, its structure and diversity, and water body banks, channels, and floodplains are, or are making significant progress toward, functioning properly and achieving an appropriate ecological condition.
Management Objective	For riparian and wetland areas, the primary management objective is to maintain and promote the following: (a) proper functioning condition (including energy dissipation, sediment capture, groundwater recharge, and channel and bank stability), and (b) the hydrologic and nutrient cycles, and energy flow. This objective is of even higher priority in the following situations: (a) where beneficial uses of water bodies have been listed as threatened or impaired pursuant to Section 303(d) of the Federal Clean Water Act, (b) where habitat is present or has been present for Federal threatened or endangered, Proposed, Category 1 and 2 candidate, and other special status species, and (c) in designated sensitive areas.
Meaning that, (consistent with characteristics of the soil type, climate and landform) the vegetation, soils and water body interact to:	Provide appropriate vegetative structure, composition and diversity, thereby promoting biodiversity and favorable habitat for aquatic and riparian-dependent species.
	Provide an appropriate vegetative canopy, thereby providing for water temperature control, shading, food supply, and recruitment of large woody debris.
	Control instream erosion, retard flood waters, dissipate flood energy, and stabilize stream channel and banks, thereby reducing flood hazard, sustaining high water quality, and maintaining the water table.
	Capture and filter sediment and pollutants from both upslope and instream sources, thereby providing for floodplain development and sustaining water quality
	Maintain or recover flow, sediment transport, and channel characteristics that sustain high quality aquatic habitat, other beneficial uses of water, and groundwater infiltration and recharge.
As indicated by (consistent with characteristics of the soil type, climate and landform) :	Riparian/wetland vegetation is vigorous and mostly perennial.
	Woody riparian/wetland vegetation is diverse in terms of age-class, developmental stages, species composition, rooting depth, and structure.
	Plant species present indicate that soil moisture characteristics are being maintained.

	Shallow-rooted, invader plant species: (1) comprise little of the cover and (2) are not displacing native species.
	Recruitment of preferred riparian/wetland species is adequate for sustaining the community.
	The vegetative canopy provides appropriate shading to the water and riparian zone.
	The vegetative canopy provides appropriate thermal regulation for fish and other riparian dependent species, resulting in cooler water during summer and reduced icing in winter.
	The vegetative canopy provides an appropriate supply of energy, nutrients (through leaf drop and litter) for aquatic and riparian-dependent species.
	Riparian/wetland vegetation provides appropriate habitat for migration, reproduction, resting, and escape for aquatic and riparian-dependent plant and animal species.
	Riparian/wetland vegetation provides an appropriate supply of food organisms for aquatic and riparian-dependent species and supports a diversity and abundance of insects and amphibians.
	Ground cover (downed logs, litter, leaves, grasses, forbs, and shrubs) in the riparian zone, wetland, or floodplain is adequate to capture and filter out most sediment and other pollutants from overland flows and rills before they enter the water body.
	Around seeps and springs, the vegetative cover is adequate to control erosion and reflects the potential natural vegetation.
	Riparian/wetland vegetation provides adequate source for continued recruitment of large woody debris.
	Large woody debris in the water body: (1) provides physical structure for good aquatic habitat and (2) is largely stable and well embedded into the banks.
	Shoreline, stream bank, and floodplain vegetation is sufficiently dense and stable to dissipate energy and minimize surface erosion during high energy (flood/wind) events.
	Root masses are sufficient to stabilize stream banks and shorelines.
	Adequate organic matter (litter and standing dead plant material) is present to protect the site and to replenish soil nutrients through decomposition.
	Point bars and other coarse textured stream deposits are vegetated or are being successfully colonized
	Portions of the primary floodplain are frequently flooded (every 1-5 years) and function to slow flood flows (through vegetative roughness), capture sediments, and reduce flood peaks.
	Stream channel is sufficiently flushed by high flows to provide a clean, well-aerated substrate for aquatic species.
	The number and diversity of species and the number and age class of the populations supported by the water body are at the desired level or are showing an improving trend.
	Stream channel has sufficient structural diversity (i.e., cascades, riffles, deep pools, undercut banks) to provide good aquatic habitat during critical life stages of aquatic species.
	Water flow and fish passage is not significantly obstructed by manmade features or debris accumulations.
	Stream morphology (i.e., width /depth ratio, roughness, sinuosity, pool frequency): (1) reflects natural functioning or recovery thereof and (2) provides physical structure for good aquatic habitat.
	Stream bank and shoreline stability reflects natural functioning or recovery thereof.
	Substrate sediments and sediment transport reflect natural functioning or recovery thereof.
	Negligible accelerated erosion as a result of human related activities is evident.
Exceptions to standard	Stockponds and water gaps which : (1) are not natural wetland and/or riparian areas and (2) produce little or no discharge to water bodies or wetlands.

Information on Standard for Water Quality	
Statement of Standard	Surface and groundwater quality complies with objective of the Clean Water Act and other applicable water quality requirements.
Management Objective	For water bodies, the primary management objective is to maintain the existing quality and beneficial uses of water, protect them where they are threatened (and range management is a contributing factor), and restore them where they are currently degraded (and range management is a contributing factor). This objective is of even higher priority in the following situations: (a) where beneficial uses of water bodies have been listed as threatened or impaired pursuant to Section 303(d) of the Federal Clean Water Act, (b) where aquatic habitat is present or has been present for Federal threatened or endangered, Proposed, Category 1 and 2 candidate, and other special status species, and (c) in designated sensitive areas.
Meaning that BLM will:	Pursuant to the Clean Water Act, maintain the physical, biological, and chemical integrity of waters flowing across or underlying the lands that it administers.
	Protect the integrity of these waters where it is currently threatened.
	Insofar as feasible, restore the integrity of these waters where it is currently impaired.
	Not contribute to pollution and immediately remedy any pollution resulting from its actions that violates applicable California, Nevada or Tribal water quality standards or other applicable water quality requirements (e.g., requirements adopted by SWRCB or USEPA pursuant to section 303(d) of the Clean Water Act or the Coastal Zone Reauthorization Act).
	Work with the states to establish appropriate beneficial uses for public waters, with the States and/or USEPA to establish appropriate numeric targets for 303(d)-listed water bodies, implement the applicable requirements to ensure that water quality on public lands meets the criteria for the designated beneficial uses of that water.
	Reasonably implement Best Management Practices (BMPs) approved by the SWRCB to protect and restore the quality and beneficial uses of water, and monitor both implementation and effectiveness of the BMPs.
As indicated by:	The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, dissolved oxygen
	Achievement of the standards for riparian areas, wetlands, and water bodies.
	Aquatic organisms and plants (e.g., macroinvertebrates, fish, algae and plants) indicate support for beneficial uses.
	Acceptable results from implementation and effectiveness monitoring or changes in management to address deficiencies identified by such monitoring.
Exceptions	Off-stream water troughs and stockponds that produce little or no discharge to surface or ground waters.

Information on Statewide Guidelines	
<u>General Guidelines</u>	
Ecology	Maintain or promote the appropriate kinds and amounts of soil organisms, plants and animals to support the hydrologic and nutrient cycles and energy flow.
Biodiversity	Maintain and promote biological diversity across the landscape by providing a mosaic of seral stages and vegetation corridors with minimal habitat fragmentation.
Fish and Wildlife	Maintain and promote the physical and biological habitat conditions necessary to sustain native populations and communities of fish and wildlife. In areas that provide habitat for Federal threatened or endangered, Proposed, Category 1 and 2 candidate, and other special status species, the primary land management objective is to maintain, enhance and restore these species and the habitats on which they depend.
Beneficial Uses of Water	In watersheds draining into water bodies that have been listed or are proposed for listing as having threatened or impaired beneficial uses, and where rangeland management activities may contribute to the pollutants causing such impairment, the primary management objective is to fully protect, enhance, and restore the beneficial uses of water.
Soils	Maintain and promote infiltration, permeability, soil moisture, and soil stability appropriate to climate, soils, and ecological site conditions.
Cultural Heritage	Protect and maintain identified sensitive cultural areas.
Other	Rangeland management shall be coordinated with other uses of public lands (e.g., recreation, archaeological sites, wildlife, horses and burros, mineral resource extraction, etc.) so that overall use does not detract from the goal of achieving rangeland health. Maintain and promote populations of desirable tree, shrub, herbaceous and grass species by taking advantage of transitional opportunities (e.g.: drought, flood, fire).
Desired Plant Community (DPC) and Potential Natural Vegetation Community	Maintain or promote achievement of the potential natural vegetation community or DPC (where that has been determined), Promote growth and reproduction, seed dissemination and seedling establishment for desired species when climatic conditions (generally in one out of every three years for grasses) and space allow. Enhance or establish populations of desirable tree, shrub, herbaceous and grass species by taking advantage of transitional opportunities (e.g.: drought, flood, fire). Maintain and promote the presence of desired seedlings, saplings, and/or mature plants in the plant community Utilization levels by establishing and implementing appropriate utilization levels.
Native and Perennial Plant Species	Maintain or promote the physical and biological conditions necessary to sustain viable populations and communities of native and perennial plants (including special status plants) by allowing them to complete their entire life cycles and sustaining the spatial distribution of microsites necessary for seed germination at appropriate intervals. Take aggressive action to reduce the invasion of undesirable exotic plant species into native plant communities. In addition to grazing management, the spread of noxious weeds will be controlled through other appropriate methods, such as fire management, use of weed-free hay, livestock purging periods, and appropriate levels of plant matter. Limit perennial plant utilization to appropriate levels of the current year's growth, unless it has been proven that this level of use is incompatible with the continued existence of the plant.
<u>Annual Rangeland Guidelines</u>	Maintain and promote the presence and distribution of microsites for seed germination. Maintain and promote sufficient amounts of residual dry matter (RDM), or standing plant material throughout the grazing season to conform with Guidelines — - —by establishing target forage use levels and implementing mulch management. Mulch levels shall include a "buffer" to account for RDM loss from other natural processes (decomposition, animal use, etc.). Exceptions to mulch management targets may be approved during the green season when substantial regrowth is expected or if lower RDM levels are required to meet particular rangeland health objectives, such as reducing competition for a desired species. Annual range readiness will be determined by the presence of RDM levels that equal or exceed established minimum thresholds.
<u>Perennial Rangeland Guidelines</u>	Developed and adopt appropriate regional guidelines specific to the perennial species on perennial rangelands.
<u>Water Body and Riparian/Wetland Area Guidelines</u>	In riparian areas, the primary management objective is to maintain and promote riparian dependent special status species (where they occur) proper functioning condition (including energy dissipation, sediment capture, groundwater recharge, and streambank stability), the hydrologic and nutrient cycles, and energy flow.

<u>General Rangeland Management Practice Guidelines</u>	Maintain and promote stream channel morphology (e.g. gradient, width / depth ratio, channel roughness and sinuosity) and functions appropriate to the climate and landform.
	Potential Natural Communities shall be achieved in the riparian zone.
	Maintain and promote sufficient residual vegetation (residual stubble and regrowth) and perennial woody vegetation to protect, improve, or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability and protection, plant vigor, plant and wildlife habitat, stream shading and temperature control, and sediment entrapment.
	Establish thresholds for mulch management (RDM and stubble height) and for utilization of herbaceous and woody plants for riparian/wetland and stream-side areas.
	Livestock grazing shall be managed to achieve the forgoing standards and guidelines. The factors to be considered in grazing management systems include, but are not limited to , the following: 1) the kind and class of livestock to be grazed; 2) intensity (stocking level), frequency, season, and duration of grazing; 3) distribution of grazing pressure away from sensitive areas (e.g., fencing, herding); 4) pasture rotation and rest; 5) rotating concentrated use areas (e.g., bedding grounds and gathering areas); 6) any mulch management (RDM and stubble height) thresholds; and 7) any utilization levels for desirable plants.
	More restrictive management practices and mulch and utilization thresholds shall be established in special situations, including, but not limited to , the following: 1) at the end of the growing season and/or at the end of the grazing season (if after fall dormancy); 2) presence of critical fisheries and/or special status species; 3) Unstable stream bank or channel conditions or unhealthy riparian areas (those not fully meeting standards, or those "functioning at risk"); 4) water bodies that have been listed as having threatened or impaired beneficial uses; 5) I (Improvement) and M (Maintenance) category allotments.
	Continuous, season-long livestock shall occur only when it has been demonstrated to be consistent with achieving healthy, properly functioning ecosystems.
	Grazing on designated ephemeral (annual and perennial) rangeland shall occur only if reliable estimates of production have been made, an identified level of annual growth or residue to remain on site at the end of the grazing season has been established, and adverse effects on perennial species are avoided.
	Livestock grazing in new allotments on native perennial grasslands shall occur only where guidelines specific to the perennial species are developed and adopted.
	Prescribed fire and (natural) prescribed fire may be utilized where needed to promote a mosaic of healthy plant communities and vegetative diversity.
<u>Management Practice Guidelines for Water Bodies and Riparian/Wetland Areas</u>	Initiate erosion control practices in areas where soil is compacted or prone to accelerated erosion after livestock grazing or other disturbance (e.g., construction and use of roads and other facilities).
	Locally-collected native species should be used for all revegetation and enhancement projects. If they are not readily available, other native species may be used. Non-native plant species shall be used only where native species are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.
	At least the minimum RDM , stubble height, and utilization thresholds shall be maintained on all riparian/wetland and stream-side areas during and at the end of the grazing season, and/or livestock shall be removed to allow time for plant regrowth sufficient to achieve the thresholds.
	Where needed to minimize impacts on water bodies, water sources, wetlands and riparian areas, livestock access these areas shall be restricted (i.e., fencing herding). Any necessary access points (e.g., water gaps, stream crossings) shall be located and designed to stabilize conditions and minimize discharges of sediment and animal waste (e.g, hardening of surfaces).
	The development of water sources (including springs and seeps) or other projects affecting water and associated resources shall promote and maintain rangeland health, ecologic and hydrologic function and processes of watercourses and riparian/wetland areas, and where practicable, year long use by wildlife.
	Locate salt blocks, other supplemental feed , and alternate shade sources well away from water bodies and riparian/wetland areas.
	New livestock handling facilities (i.e., watering facilities, trails, and roads) shall be located outside of riparian/wetland areas and designed to minimize concentrations of livestock where discharges of sediment and animal wastes to water bodies could occur.
	If existing livestock handling facilities that are located inside a riparian/wetland area, threaten attainment of standards, the threat shall be eliminated, either by modifications to the design and use of the facility or by relocating it as a new facility.

	<p>Limit livestock trailing, bedding, watering, loading, and other handling efforts to those areas and times that will not retard or prevent attainment of standards. Avoid trailing in vernal pools and wetlands whenever possible.</p>
<p><u>Rangeland Monitoring and Adaptive Management Guidelines</u></p>	<p>Rangeland monitoring to determine utilization of forage resources and trend of rangeland health shall be conducted as needed in each allotment based on current accepted practices and techniques. Monitoring methodologies will be applicable to local conditions and developed in consultation with permittees and interested publics.</p>
	<p>Rangeland monitoring to determine the implementation and effectiveness of the standards, guidelines, and the practices specified under them shall be conducted in all special situations (as identified pursuant to guideline #—).</p>
	<p>If monitoring or verified observation indicates that one or more of the standards or guidelines is not being met or that substantial progress is not being made toward meeting a standard or guideline, and if there is evidence that current rangeland management practices are causing or contributing to this unsatisfactory condition, appropriate adjustments (more or less restrictive) shall be made to the thresholds for RDM, stubble height, and/or plant utilization and to allowable rangeland management practices.</p>

DEPARTMENT OF FISH AND GAME

1416 NINTH STREET

P.O. BOX 944209

SACRAMENTO, CA 94244-2090

(916) 653-7667



August 27, 1997

Mr. Ed Haste, State Director
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, California 95825-0451

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Dear Mr. ~~Haste~~ Haste:

In response to your request for comments, the Department has reviewed the Bureau of Land Management's draft Environmental Impact Statement for "Rangeland Health Standards and Guidelines for California and Northwestern Nevada." Attached are the Department's specific comments. We have put a great deal of staff time into this review, and I hope our comments are used to improve the subject document.

A significant policy of this State is to encourage the preservation, conservation, and maintenance of wildlife resources. The Department has the lead responsibility in this regard, and we desire to work closely with the Bureau to assist you in meeting your goal of achieving and maintaining healthy, sustainable rangeland ecosystems on the 4.2 million acres of rangeland addressed by this document. As our trustee responsibility encompasses all of California, I request that your final Standards and Guidelines for the three major resource areas (Bakersfield, Ukiah, and Susanville) be as consistent as possible.

34-1

Several million Californians use and enjoy the State's wildlife and public land resources for a variety of reasons. In recent years, the public have been increasingly expressing their opinions and desires about public lands grazing to the Department. Our comments reflect this, and they are also based on the extensive interaction my staff has had with Bureau staff regarding livestock grazing, particularly in northeastern California and on the east side of the Sierra Nevada.

I look forward to the implementation of appropriate Standards and Guidelines on public rangelands. If you have any questions regarding this matter, feel free to contact me at (916) 653-7667 or have your staff contact Dr. Eric R. Loft, Wildlife Management Division, at the letterhead address or by telephone at (916) 653-7203. Thank you for your consideration of the Department's input.

Sincerely,

Jacqueline E. Schafer
Director

Attachment

cc: See page two.

Mr. Ed Haste
August 27, 1997
Page Two

cc: Mr. Willie Molini
Nevada Division of Wildlife
Reno, Nevada

**Comments by the California Department of Fish and Game
on the Draft Environmental Impact Statement for
"Rangeland Health Standards and Guidelines for California and
Northwestern Nevada"**

The following comments reference the chapter and section of the Draft Environmental Impact Statement for "Rangeland Health Standards and Guidelines for California and Northwestern Nevada."

CHAPTER 1

- 34-2 Section 1.2 - The purpose and need for standards and guidelines do not describe any economic considerations, such as sustaining traditional livelihood, as being a factor. Rather, the purpose and need of this document, and of standards and guidelines, are purely ecologically based. Yet, an economic analysis of costs to ranchers is included with no corresponding analysis of benefits (monetary as well as ecological) to California for the listed alternatives.
- 34-3 Section 1.3 - Alternative 4 cannot be called a "rapid recovery" alternative, because recovery and protection were called for decades ago. For example, existing (and longstanding) regulations direct the authorized officer to ensure watersheds are in, or making significant progress toward, proper functioning condition (PFC); the Taylor Grazing Act in 1934 and the Public Rangelands Improvement Act in 1978, as well as other laws and regulations, have directed the Bureau of Land Management (BLM) to protect resources from degradation for many years.
- 34-4 Section 1.3c - Compliance with State water quality standards is fundamental to rangeland health. However, the Susanville Resource Advisory Council (RAC) area has exempted itself from this requirement.
- 34-5 Section 1.3d - "Habitats are, or are making significant progress." Significant is undefined. How will significance be measured? How does the trustee agency for wildlife (DFG) fit in the process of determining whether recovery of wildlife (hereafter refers to all species of fish, wildlife, and native plants) is being made?
- 34-6 Section 1.7 - Assumption 10, how could BLM know that removing livestock "will not fix a problem" if they don't remove livestock to determine whether livestock have an impact? From an ecosystem perspective, this assumption fails to consider the reality of indirect effects of livestock on the environment.

34-7 [Section 1.8 - The statement "The viability of native plant and animal communities must be addressed..." is not addressed.

34-8 ["BLM will continue to follow existing laws such as the Clean Water Act..." The Department believes BLM must follow existing laws. Why does the Susanville water quality standard (see Chapter 2, page 20) not follow existing law?

CHAPTER 2

34-9 [Section 2.4, Prioritization - BLM cannot conclude an area that is "severely degraded" or has "passed a threshold", or has "little or no chance for recovery" is of low priority if recovery has not been attempted. BLM should be consistent in their management direction (towards ecosystem health) and implement grazing exclusion on a landscape scale to test whether such areas can recover. Too often, BLM states there is no potential for recovery without having tested on a large ecosystem scale, yet at the same time, continues to authorize *status quo* livestock grazing in those very areas.

34-10 [Section 2.5 - Setting standards and guidelines based on local interests that "...would meet the needs of their area" has excluded the majority of Californians and Americans concerned about public lands issues.

34-11 [Section 2.51 - The standard for species provides no indicators for animals other than "special status" species. What are the indicators for other animal species, such as the hundreds of game and nongame fish, bird, mammal, and amphibian species?

34-12 [Guideline 16 - The BLM should implement grazing systems that will be in compliance with water quality standards rather than promote compliance with the standards.

34-13 [Section 2.52 - The riparian standard for Ukiah desires to achieve "late seral stages", while for Bakersfield it desires to achieve "advanced ecological status", and for Susanville they merely want to achieve PFC. These standards are inconsistent and do not meet the riparian standards described in the referenced document Rangeland Health 1994.

34-14 [Under the standards for species, the Department of Fish and Game recommends that adequate stubble height (ground cover) of grasses and forbs be maintained to provide nesting and escape cover for ground nesting birds. This is a quantifiable objective.

34-15 [Guideline 17 contradicts the previously mentioned Section 2.4 on prioritization. The Department concurs with this guideline that degraded areas should first be completely rested to determine whether recovery can occur. This should be a management action prior to dismissing an area as having "passed a threshold" or having "little or no chance for recovery." This guideline should apply to all three RACs.

34-16 [Guideline 18 should be incorporated into all three RAC areas.

- 34-17 Section 2.53 - Standards should relate to site capability or potential, however, BLM must determine whether a site has greater ecological potential than believed through the use of real information and data. Complete rest from livestock grazing on an allotment scale has not been attempted to evaluate whether Susanville area allotments have more potential to recover or produce a diverse mix of vegetative growth than BLM describes in this document. If restoration actions are determined to be infeasible, then, and only then, should the BLM accept a lesser "modified capability" standard.
- 34-18 How will BLM monitor/assess capability of aquatic/fishery resources given staffing limitations in some areas, such as Susanville, with no fishery biologists?
- 34-19 Standard 2 - The stream water surface temperature criteria is vague, with the standard not well described. What is meant by "high" shading, and for what distance along the stream channel?
- 34-20 Standard 3 - Water quality standard must comply with Clean Water Act. The standard described is vague. A desired beneficial use of water on public lands is to provide drinking water and clear running streams for resource values.
- 34-21 Standard 4 - Fails to meet the goals set by BLM for riparian/wetland areas. This riparian standard has no stated intent to improve riparian conditions in the Susanville RAC. There must be measurable significant progress made. As this document identifies northeastern California (Modoc and Lassen counties) as being the major problem in the State needing grazing reductions (Section 4.3.4.4, page 37), logic suggests that significant progress is especially needed in the Susanville RAC, as well as in the other RACs.
- 34-22 The Department recommends that standards for ground cover of herbaceous vegetation and for vertical wildlife nesting/escape cover be established.
- 34-23 Any livestock watering system that occurs on the stream (e.g., water gaps in fences) is part of the riparian system because of the downstream effects of siltation, nutrient/bacteria loading, erosion, hoof action, and slope destruction. The impacts of livestock at these sites and their impacts downstream has not been presented. Nor has there been any disclosure about how these parameters will be monitored or mitigated.
- 34-24 Highly valued plant communities, such as bitterbrush, mountain mahogany, riparian, and aspen, should be allocated for their own intrinsic value and their wildlife value, rather than for livestock grazing. Yet there are no proposed standards for browse species in these habitats. Guidelines allowing 50% utilization of browse will not achieve the desired rangeland health.
- 34-25 Guideline 1 - The stubble height threshold is too obscure and does not consider residual litter requirements needed to maintain and enhance soil conditions, vegetative productivity,

34-25 and plant vigor. The "requirement" for plant vigor, bank protection, and sediment
cont. confinement is not defined.

34-26 The "fragile fisheries habitats" are the norm for northeastern California, given the harsh climate, compounded by impacts of livestock grazing. The "restrictive utilization thresholds" will and should apply to all fishery/riparian habitats rather than stating they "...may require..."

34-27 Hoof action monitoring must consider the impacts of bank sloughing, compaction, and hummocking of the primary flood plain, as well as instream impacts.

34-28 Guideline 2 - Potential natural communities (PNCs) are supposedly stable communities in the absence of human-caused influence. However, this guideline identifies a "desired" seral state in the presence of livestock. These are contradictory statements, and it is unclear whether the guideline applies only to riparian zones. If so, does that mean grazing will be excluded from riparian areas until PNC is achieved?

34-29 Guideline 3 - How will periods of rest be implemented, and at what scale? The Department recommends that rest periods be implemented at an ecosystem, or at least an allotment, scale. Environmental stress occurs every year in the plant community.

34-30 Guideline 5 - Desired plant species are not identified, nor is it made clear "desired" for what purpose. The Department recommends local ecotypes of native grass, forb, shrub, and tree species as being desired.

34-31 Guideline 8 - This guideline is vague. Who will determine the habitat requirements for wildlife, at what level will requirements be set, what are the consequences if requirements are not met for any of the hundreds of fish, wildlife, and plant species that occur in the Susanville RAC? As written, this guideline has little substance and could be subject to wide interpretation. As trustee for the State's wildlife, the Department should make the determination as to whether grazing use has adequately provided for habitat requirements of fish, wildlife, and native communities.

34-32 Guideline 10 - National Environmental Policy Act (NEPA) review to consider impacts to nontarget species must be completed prior to implementation of plant species eradication projects.

34-33 Guideline 13 - The developments described in this guideline need to consider the direct impacts on fish and wildlife already dependent upon these water sources (before the development project is initiated). Wildlife, fish, and habitat "health" should be promoted in addition to "rangeland health."

34-34 Guideline 14a states "Maximum 60% utilization of herbaceous vegetation" and "Maximum 50% utilization of perennial or native herbaceous and browse species..."

These utilization levels are too high to enable recovery and maintenance of rangeland health. For example, Holechek's (1991, 1995) work, cited in Chapter 3, pages 14-15, indicates that 50% utilization causes range destruction in most of the arid west; stocking at 30-40% will enable recovery; and ranges that are in poor condition or are grazed during active growth (as is done in California) should receive utilization on the low end of those described in Table 3.2.5, or no more than 30% utilization for northeastern California ranges.

34-34
cont.

For purely range livestock management purposes, such high levels of utilization may be acceptable. However, BLM's objectives and goals go beyond what we traditionally would call proper range management for livestock. Objectives/goals have evolved into attempting to restore, enhance, and protect ecosystem health for all resources, not just to provide food and fiber. Because of this shift in direction, traditional range management options no longer suffice.

BLM knows full well of this Department's concerns (based on several years of East Lassen discussions, meetings, comment letters, and appeals) about allowing browse utilization of up to 50%, particularly on bitterbrush, willow, aspen, ceanothus, and mahogany stands.

The Department recommends no more than 20% use on any browse species by livestock, because of the "switching" phenomenon exhibited by livestock from herbaceous to browse forage after they exceed desired levels of use on herbaceous forage. Such a level would be consistent with the broader desire of BLM to initiate proper ecosystem management, as opposed to proper range management, as previously mentioned.

34-35

The Department, as trustee for California's wildlife, does not have a category titled "Crucial (Essential) Deer Habitat." Please describe the intent and geographic areas involved.

34-36

There is no guideline relating to the extensive areas of ephemeral range which the Susanville BLM has identified with use pattern mapping. A guideline similar to Guideline 15 of Alternative 3 is needed for the Susanville RAC to address the vast acreages of ephemeral ranges in that area. When the ephemeral range does not produce forage, all herbivores rely on the limited upland shrub and riparian vegetation, thereby exceeding desired grazing levels.

Section 2.6, Alternative 2 - Statewide Consistency

34-37

There is no preamble for Alternative 2. What is the intent of Alternative 2?

34-38

The standard for all riparian areas regardless of RAC area should be a measurable upward trend if they are functioning at risk or are nonfunctional. This standard should be applied to each of the alternatives.

- 34-39 Water quality standard must be in compliance with the Clean Water Act and other existing laws. That is the minimum standard.

Section 2.6, Alternative 3 - No Action

- 34-40 The "fall-back standards" provide compelling evidence of the lack of progress intended for the Susanville RAC. All four fall-back standards (for soils, riparian/wetland, stream function, and native species) are nearly verbatim the standards proposed for the Susanville RAC. Consequently, the BLM is proposing "no action" for the Susanville RAC, despite identifying the area as having the greatest problems related to livestock grazing. BLM has, in effect, proposed Alternative 3 for the Susanville RAC.
- 34-41 Guidelines 1-7 are inadequate to meet objectives for improving overall rangeland condition. Maintaining status quo should not be a minimum guideline.
- 34-42 Guidelines 8-15 appear appropriate for improving overall rangeland condition and ought to be incorporated in all RACs.
- 34-43 There is no Section 2.7. The table of contents doesn't correspond with the chapter section numbers.

Section 2.8, Alternative 4

- 34-44 The BLM has not provided any reasoned analysis, consistent with Federal Lands Policy and Management Act requirements, describing why a "gradual, incremental, approach toward improved management" is more desirable than correcting problems "as fast as possible." Alternative 4 advocates improvement that has been known to be needed for decades, but has not been implemented. It is not a rapid recovery or rapid improvement alternative, rather it is a benchmark that needs to be crossed for BLM to show it has the temerity to implement needed (and required) change after decades of posturing and debate.
- 34-45 The isolation of the water quality standard as the only item differing from Alternative 2 indicates the reluctance of the BLM to comply with clean water standards in RACs where less than compliance is currently accepted, namely the Susanville RAC.
- 34-46 Modification of grazing strategy (numbers, duration, season) are clearly the most cost-effective mechanisms available to the BLM to attempt to overcome unsatisfactory conditions caused by livestock. While improvement cannot be guaranteed on many areas with the removal of livestock, case study after case study published in *Rangelands* magazine indicates it works.

CHAPTER 3

- 34-47 Page 8 - The category "I" allotments are identified here as "improvement needed", while in Appendix 5 they are identified as allotments having "potential for increasing resource

34-47
cont. production or conditions." The two descriptions are not the same, and the Department has been led to believe over the years that category "I" allotments are those specifically targeted for and needing improvement. Which interpretation, if either, is correct?

34-48 Section 3.5, Wildlife, page 49 - The section describing elk needs to include the significant presence of elk populations in northeastern California. These populations have been on the increase for the past decade or so, with elk expanding their range into California's part of the Great Basin. BLM should recognize that allocation of forage resources to this growing population of elk will have to be made just as they are for wild horses and burros.

34-49 The wildlife section only describes ecological factors for three big game species and a handful of upland game species. If the intent is to produce an ecosystem-based management scheme for rangelands to help conserve California's biodiversity, then this document is inadequate in describing the affected environment.

34-50 According to the figures provided in the document, wild horses and burros account for 13 percent of the total animal unit months (AUMs) in northeastern California (31,080 AUMs out of 238,975 AUMs). Control of these populations is needed; however, it obviously would be more effective to consider modifying the 87 percent AUMs attributed to livestock to achieve management goals and objectives.

34-51 There appear to be no guidelines in the Draft Environmental Impact Statement for any of the three RACs that describe actions to be taken if/when livestock use on herbaceous or shrub vegetation, or impact on soil or water, exceeds the levels described in standards and guidelines. What are the guidelines for implementing management change, such as livestock increases or reductions based on monitoring data? How soon does action take place if specific standards and guidelines are not being met (e.g., two weeks, a month, or the following grazing season)?

34-52 Section 3.8 - The BLM appears to be arguing to accept negative ecological impacts of livestock grazing so that the "positive" effect of seeing cattle on western ranges by people from outside the United States can feel they are in the "wild west." The logic here is incorrect, as well as being an untested conclusion. The overwhelming number of foreign tourists in the west come to see the natural beauty of wildlife and landscapes in the absence of livestock (e.g., national parks and monuments). The so-called positive impacts or "city slicker" activity applies well to dude ranches on private lands, but not on public lands.

34-53 Negative impacts of the proposed standards and guidelines on hunting and fishing or wildlife viewing opportunity are not considered. We refer the BLM to their own documentation in the Fish and Wildlife 2000 series as to the importance of hunting and the potential impacts of grazing on recreational opportunity. There is no disclosure of the tradeoffs between the negative impacts on the hundreds of wildlife species (and

34-53
cont.

concomitant negative impacts on recreation economics) and the positive impacts of livestock discussed on local economics or foreign tourists.

As none appear to be cited in this chapter, there apparently are no positive, ecological impacts of livestock grazing.

34-54

Section 3.11, Economic Conditions - The economic conditions of the effects/impacts of grazing on the ecosystem, on wildlife, and on recreational opportunities are not considered in this document. There is no way from an economic perspective to weigh the benefits or costs of the various alternatives. All we can determine from this analysis is the single-use economics related to the few permittees of BLM lands in California, as opposed to the millions of "user days" on these lands for recreational purposes. The economic analysis is inadequate and does not provide the required reasoned analysis required by federal law.

CHAPTER 4

34-55

This chapter lumps the three RACs together in impact analysis, although they each have their own specific and varying standards and guidelines. This makes it impossible to reasonably evaluate the potential impacts of each RAC's proposed actions within that RAC.

34-56

Section 4.1 - The "fallback standards" do not address the "fundamentals of watershed function, nutrient cycling and energy flow, water quality, and habitat for special status species and native plant and animal populations." As the Susanville RAC proposal is virtually identical to the fallback standards, the BLM is concluding that the Susanville RAC proposal is inadequate, and the Department agrees.

34-57

Section 4.2.2.1 - BLM has concluded that little can be done with allotments infested with medusa-head. While this may be true, BLM has yet to experimentally test the hypothesis on a large scale using treatments such as grazing exclusion for several years at an allotment scale.

34-58

Section 4.2.2.2 - If the positive changes described for sagebrush-steppe would occur the fastest under Alternative 4, why would another alternative be preferred?

34-59

As previously stated, the Susanville utilization guidelines are excessive and inappropriate to achieve the stated goals of rangeland health. Several BLM documents written between 1991 and 1994 for the East Lassen area confirm that the allowable utilization proposed is too high to achieve rangeland health and PFC in those areas that aren't already there.

34-60

Section 4.2.3.2 - If the positive changes described for riparian vegetation would occur the fastest under Alternative 4, why would another alternative be preferred?

34-61

The statement about the Susanville RAC changing fastest under Alternatives 1 or 2 is inconsistent, because the Susanville proposal is nearly identical to Alternative 3. The conclusion is inconsistent with the entire intent of a "rapid-recovery" alternative.

34-62

Does reducing or excluding livestock from severely degraded areas require major work as suggested? Degraded areas should be obvious to document, and it should be straightforward to change the grazing regime. The Department and Nevada Division of Wildlife have brought many of these areas to the attention of the BLM in northeastern California.

34-63.

Section 4.2.3.3 - There is no assessment as to which alternative results in the most desired and quickest response in riparian hydrology or water quality. The Department assumes that Alternative 4 would be the "best" in this regard.

34-64

Section 4.2.4 to 4.2.5 - There is no assessment or disclosure of how each alternative will impact wildlife communities, habitats, vegetation types, mule deer, elk, pronghorn, upland game, or fisheries. However, Alternative 4 is identified as accomplishing some goals the fastest.

34-65

Section 4.2.7 - No disclosure of how recreational opportunities would be affected by alternatives is provided, although Alternative 4 is again identified as providing some of the fastest desired effects.

34-66

Section 4.3.4 - The economic analysis fails to disclose the potential impacts of each alternative on wildlife recreation-related economics, a significant component of the lands in question. Hunting, fishing, wildlife viewing, and associated supporting uses (groceries, fuel, supplies, lodging, sale of hunting access by ranchers, guide services, etc.) are not considered at all. The economic analysis provided is only one small component of the economic picture on public lands. No reasonable conclusions based on this limited analysis are possible in making a determination as to suitability of one alternative over another.

BLM has available their document *Big Game Habitat Management - Fish and Wildlife 2000* (1993), which provides an inkling of some of the wildlife value on BLM lands in the State. For deer alone, the value in 1985 dollars was estimated to be over \$13 million a year, much of which is directed back to local, rural economies where hunting occurs. This does not include the value of pronghorn, elk, black bear, or upland game/waterfowl species values for hunting. Nonconsumptive wildlife values (defined by BLM as observing, photographing, or feeding wildlife—note that doing same for livestock is not considered a recreational opportunity, as suggested in the Draft Environmental Impact Statement on page 57 of Chapter 3) were valued at \$27 million per year in 1985 dollars. Combined, the nonlivestock value of BLM lands is staggering compared to the value of the grazing on these lands, especially when the number of 3+ million visitor days is considered. Why are not these values, and their expected changes according to the alternatives, included in the economic analyses?

34-66
cont

The analysis provides the reader with information only on the costs of alternatives to the rancher, local community, and the BLM, with little or no information provided on other costs (e.g., wildlife loss, soil degradation, resource conditions, or recreation) or the diverse benefits of each alternative to these same entities, as well as to other economic values.

34-67

Section 4.3.4.1 - As the "fallback" no action alternative has the same economic consequences as the proposed alternative, and the changes in AUMs are the same, the proposed alternative is essentially the same as the no action alternative in terms of grazing management. That is, if no action results in reduction of 16,267 AUMs and the proposed action also results in a reduction of 16,267 AUMs, how can the proposed action succeed at meeting the goals and objectives?

34-68:

BLM has concluded that rapid recovery of the ecosystems they administer would require approximately \$800,000 over 5 years statewide in program costs. BLM has also concluded that about 10 jobs and \$1 million would be the cost to the ranching industry to implement rapid recovery, as opposed to the proposed alternative. Not included in the analysis to fairly evaluate the proposal is the likely benefit to fish and wildlife resources and concomitant recreational value that would rapidly accrue with implementation of Alternative 4.

BLM has concluded that they could well be on the road to "rapid" recovery of rangelands they administer in California for about \$2 million additional cost to California and the United States over the next 5 years, or approximately \$400,000 per year. What is the benefit to California and the United States to implement recovery of rangelands at a rapid rate? BLM has not provided that number, but the Department believes it far exceeds the cost.

34-69

Appendix 7 - Why is there no condition and trend assessment provided for riparian/wetland areas, as these are the most significantly impacted and so heavily focused on for monitoring purposes?

Final Comments

34-70

As range scientists and managers know, once you have achieved good to excellent rangeland health conditions, you can typically carry more livestock than you previously had supported. Alternative 4 begins to get at the long-term approach needed for management of western rangelands.

34-71

Long-term understanding of rangeland dynamics and productivity and a new investigation and study of potential productivity are needed on an allotment-level or ecosystem-level scale. Manipulation of herbivores on a large scale may be necessary to adequately begin to understand the factors affecting ecosystem health. We recommend this involve allotment-scale

34-71
cont

studies that preclude all livestock grazing for a period of time. This would enable the most rapid recovery opportunity on some components, while illustrating that recovery of all degraded rangelands likely involves far more effort, and is more complex, than simply removing livestock.

34-72

Time frames to achieve restoration objectives should be clearly stated. When will recovery efforts begin, how long are they expected to take, and what actions will be implemented if progress toward restoration is not occurring as rapidly as expected or desired? This is especially important where livestock grazing is allowed to continue at some level in areas where the rangeland is considered "unhealthy" or is not at PFC.

34-73

Given the greater rangeland health improvements offered by Alternative 4 compared to the other three alternatives, countered only by some economic consequences associated with loss of AUMs (and the lack of disclosure about the nonlivestock economic benefits/costs of alternatives), the Department supports Alternative 4.



SHASTA COUNTY

BOARD OF SUPERVISORS

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PATRICIA A. "TRISH" CLARKE, DISTRICT 5

August 26, 1997

Edward Hastey, State Director
BUREAU OF LAND MANAGEMENT
2135 Butano Drive
Sacramento CA 95835

Subject: Rangeland Draft Environmental Impact Statement

Dear Mr. Hastey:

At the direction of the Shasta County Board of Supervisors, I am responding to the Draft Environmental Impact Statement (DEIS) regarding rangeland health standards and guidelines for California and Northwest Nevada. As the governing Board representing our area, we favor Alternative #1 of the four alternatives outlined in the environmental impact statement.

As you know, the BLM created three Resource Advisory Councils for the areas in your jurisdiction. Alternative #1 consists of standards and guidelines developed by the three Councils for their representative areas. These Councils included members of the interested public, and members representing elected boards of supervisors. The three elected California officials on the Resource Advisory Councils - Bill Maze, Tulare County, Nancy Huffman, Modoc County, and Denny Bungarz, Glenn County - have recommended Alternative #1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law and the BLM, and has the least negative effect on the cattle industry and the counties of the area.

Alternative #1 was developed by a group of citizens with varied backgrounds and interests, after considerable training in basic ecological processes.

Your favorable consideration of our recommendation is appreciated.

Very truly yours,

RICHARD DICKERSON, Chairman
Shasta County Board of Supervisors

c: The Honorable Assembly Member Tom Woods
The Honorable Senator K. Maurice Johannessen
Don Peterson, Legislative Advocate
Steve Szalay, Executive Director, CSAC
Les Cohen, Regional Council of Rural Counties
Members, Shasta County Board of Supervisors

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SHASTA COUNTY

BOARD OF SUPERVISORS

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PATRICIA A. "TRISH" CLARKE, DISTRICT 5

Edward Hastey, State Director
BUREAU OF LAND MANAGEMENT
2135 Butano Drive
Sacramento CA 95835

August 26, 1997

Subject: Rangeland Standards

Dear Mr. Hastey:

As Supervisor of District 5, Shasta County, I am responding to the Draft Environmental Impact Statement (DEIS) regarding rangeland health standards and guidelines for California and Northwest Nevada. Of the four alternatives outlined in the environmental impact statement, I favor Alternative #1.

35.2-1

Three Resource Advisory Councils were created by BLM to study rangeland standards for the areas in your jurisdiction, and Alternative #1 consists of standards and guidelines developed by the three Councils for their representative areas. The Councils included members of the interested public, and members representing elected boards of supervisors, all of whom received considerable training in basic ecology.

The three elected California officials on the Resource Advisory Councils - Bill Maze, Tulare County, Nancy Huffman, Modoc County, and Denny Bungarz, Glenn County - have recommended Alternative #1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law and the BLM, and has the least negative effect on the cattle industry and the counties of the area. I agree with that opinion.

On behalf of my constituents, I thank you for your consideration of my recommendation.

Very truly yours,

A handwritten signature in cursive script that reads "Patricia A. Clarke".

PATRICIA A. "Trish" CLARKE
Supervisor, District 5
County of Shasta

c: Honorable Assembly Member Tom Woods
The Honorable Senator K. Maurice Johannessen
Don Peterson, Legislative Advocate
Steve Szalay, Executive Director, CSAC
Les Cohen, Regional Council of Rural Counties
Members, Shasta County Board of Supervisors

RANGE.EIR/PAC/HDL/cbr



SHASTA COUNTY

BOARD OF SUPERVISORS

1815 Yuba Street, Suite 1
Redding, California 96001
(916) 225-5557
(800) 479-8009
(916) 225-5189-FAX

MOLLY WILSON, DISTRICT 4

Edward Hastey, State Director
BUREAU OF LAND MANAGEMENT
2135 Butano Drive
Sacramento CA 95835

August 26, 1997

Subject: Rangeland Standards

Dear Mr. Hastey:

As Supervisor of District 4, Shasta County, I am responding to the Draft Environmental Impact Statement (DEIS) regarding rangeland health standards and guidelines for California and Northwest Nevada. Of the four alternatives outlined in the environmental impact statement, I favor Alternative #1.

The BLM created three Resource Advisory Councils to study rangeland standards for the areas in your jurisdiction, and Alternative #1 consists of standards and guidelines developed by the three Councils for their representative areas. These Councils included members of the interested public, and members representing elected boards of supervisors. The three elected California officials on the Resource Advisory Councils - Bill Maze, Tulare County, Nancy Huffman, Modoc County, and Denny Bungarz, Glenn County - have recommended Alternative #1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law and the BLM, and has the least negative effect on the cattle industry and the counties of the area. I concur with that opinion.

Thank you for your consideration of my recommendation.

Very truly yours,

A handwritten signature in cursive script that reads "Molly Wilson".

MOLLY WILSON, Supervisor, District 4
County of Shasta

c: Honorable Assembly Member Tom Woods
The Honorable Senator K. Maurice Johannessen
Don Peterson, Legislative Advocate
Steve Szalay, Executive Director, CSAC
Les Cohen, Regional Council of Rural Counties
Members, Shasta County Board of Supervisors

RANGE.EIR/MW/HDL/cbr

35.3-1



SHASTA COUNTY

BOARD OF SUPERVISORS

1815 Yuba Street, Suite 1
Redding, California 96001
(916) 225-5557
(800) 479-8009
(916) 225-5189-FAX

IRWIN FUST, DISTRICT 2

Edward Haste, State Director
BUREAU OF LAND MANAGEMENT
2135 Butano Drive
Sacramento CA 95835

August 26, 1997

Subject: Rangeland Standards

Dear Mr. Haste:

As Supervisor of District 2, Shasta County, I am responding to the Draft Environmental Impact Statement (DEIS) regarding rangeland health standards and guidelines for California and Northwest Nevada. Of the four alternatives outlined in the environmental impact statement, I favor Alternative #1.

The BLM created three Resource Advisory Councils to study rangeland standards for the areas in your jurisdiction, and Alternative #1 consists of standards and guidelines developed by the three Councils for their representative areas. These Councils included members of the interested public, and members representing elected boards of supervisors. The three elected California officials on the Resource Advisory Councils - Bill Maze, Tulare County, Nancy Huffman, Modoc County, and Denny Bungarz, Glenn County - have recommended Alternative #1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law and the BLM, and has the least negative effect on the cattle industry and the counties of the area. I concur with that opinion.

Thank you for your consideration of my recommendation.

Very truly yours,

A handwritten signature in black ink, appearing to read "Irwin Fust", is written over the "Very truly yours," line.

IRWIN FUST, Supervisor, District 2
County of Shasta

c: Honorable Assembly Member Tom Woods
The Honorable Senator K. Maurice Johannessen
Don Peterson, Legislative Advocate
Steve Szalay, Executive Director, CSAC
Les Cohen, Regional Council of Rural Counties
Members, Shasta County Board of Supervisors

RANGE.EIR/RD/HDL/cbr

35.4-1



SHASTA COUNTY

BOARD OF SUPERVISORS

1815 Yuba Street, Suite 1
Redding, California 96001
(916) 225-5557
(800) 479-8009
(916) 225-5189-FAX

GLENN HAWES, DISTRICT 3

Edward Hastey, State Director
BUREAU OF LAND MANAGEMENT
2135 Butano Drive
Sacramento CA 95835

August 26, 1997

Subject: Rangeland Standards

Dear Mr. Hastey:

As Supervisor of District 3, Shasta County, I am responding to the Draft Environmental Impact Statement (DEIS) regarding rangeland health standards and guidelines for California and Northwest Nevada. Of the four alternatives outlined in the environmental impact statement, I favor Alternative #1.

Three Resource Advisory Councils were created by BLM to study rangeland standards for the areas in your jurisdiction, and Alternative #1 consists of standards and guidelines developed by the three Councils for their representative areas. The Councils included members of the interested public, and members representing elected boards of supervisors, all of whom received considerable training in basic ecology.

The three elected California officials on the Resource Advisory Councils - Bill Maze, Tulare County, Nancy Huffman, Modoc County, and Denny Bungarz, Glenn County - have recommended Alternative #1 as the preferred alternative. In their opinion, this alternative meets the objectives of the law and the BLM, and has the least negative effect on the cattle industry and the counties of the area. In Shasta County, the cattle industry - and agriculture in general - are an important part of our economy.

On behalf of my constituents, I thank you for your consideration of my recommendation.

Very truly yours,

A handwritten signature in cursive script that reads "Glenn Hawes".

GLENN HAWES
Supervisor, District 3
County of Shasta

c: Honorable Assembly Member Tom Woods
The Honorable Senator K. Maurice Johannessen
Don Peterson, Legislative Advocate
Steve Szalay, Executive Director, CSAC
Les Cohen, Regional Council of Rural Counties
Members, Shasta County Board of Supervisors

RANGE.EIR/GH/HDL/cbr

35.5-1

To	Initial	Date
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Letter # 36, page 1

1750 Camino Corrales
Santa Fe, NM 87505
29 August 1997

Ed Hastey, State Director
Bureau of Land Management
2135 Butano Drive
Sacramento, California 93825

*comment on Draft EIS,
Rangeland Health Standards*

Dear Mr. Hastey:

A copy of W. A. Laycock's review of your Draft EIS, Rangeland Health Standards and Guidelines, arrived on my desk. Of the EIS itself I have only eight pages from Chapter 3, so I can't say much about it. But my old associate Bill Laycock's strongly expressed ideas on utilization and diversity deserve comment.

Mr. Laycock is correct that utilization is misused by the agencies. It does not follow, as he claims, that utilization should not be used as a guide for stocking or that information on utilization in the Draft EIS is erroneous and should be removed. For example, independent studies in the semidesert grassland over 75 years have been remarkably consistent in finding that less than 40% of black grama growth should be grazed (Havstad & Schlesinger 1996, Forest Service INT-GTR-338). It would be wrong to use this criterion by itself to set stocking levels, but I don't know anyone who advocates that.

Use-level does become devilishly hard to employ, though, in view of several-fold year-to-year variation in forage production and in view of the desirability of grazing systems that affect the timing of use (for instance, more can be used in dormant-season grazing). To cut through these difficulties, a simpler criterion (but closely correlated with use-levels; see for instance correlations in Hedrick 1958, J. Range Mgmt. 11: 34-43) is preferable: stubble height. Minimal stubble-height standards (of course incorporating some flexibility) cut through most of the difficulties of use-levels. Keeping residue of specified height on the ground provides for plant health, erosion control, and wildlife habitat without worrying about averaging abstruse, difficult measurements of percentage use. For riparian areas, for instance, see Clary et al. 1996 (Rangelands 18: 137-140). Mr. Laycock couples stubble-height with use-levels in his critique, but in fact gives no argument against use of stubble-height (except the valid one that the more local the standard, the better). I strongly recommend emphasis on use of stubble-height—but not, of course, to the exclusion of trend data, and in some instances of supplementary requirements such as a percentage of seed-heads that should be left at the end of the growing season.

Mr. Laycock claims that improving mid-seral communities to high-seral will decrease species diversity. He could cite studies to support this generalization, for instance from sagebrush and aspen communities. In grasslands livestock grazing as it has been practiced (mainly season-long) has greatly decreased species richness; here in much the Southwest it is the difference between a sea of blue grama on grazed lands vs. patches of five to ten or more perennial grass species in adjacent cemeteries or other enclosures. Where livestock grazing does cause increases in species numbers, the added species are apt to be shrubs or annuals (often exotics) that come in where bare earth appears; hardly a

36-1

36-2

36-2
cont.

desirable increase. Grazing pressure increases species evenness, so that a study that used meter-square plots would find more species per plot under heavy grazing (that is, fewer plots are needed to capture, say, 80% of all species) and might conclude that diversity had been increased when in fact there were more species in sufficiently large samples of ungrazed areas. My conclusions are that I do not trust the generalization that diversity decreases at high-seral stages and that even where that does happen, it is needful to inspect the nature of "increased" mid-seral diversity. Diversity is, of course, a complex problem, not encapsulated by either Mr. Laycock's generalizations or mine; see West 1993 (J. Range Mgmt. 46: 2-13) and West, editor, 1995 (Biodiversity on Rangelands, Utah State Univ. Coll. of Natural Resources). My point is that you need not fear moving lands toward high-seral conditions because of lost diversity; even where species numbers decline, other elements of diversity such as patchiness will increase.

I guess that I'm moved to submit these comments because of the tone of Bill Laycock's critique: he has the answers and others (such as Jerry Holechek) are out of step with "range science." Neither range science nor the Society for Range Management is anywhere close to unanimous in these complexities. Bill is a master of the science but even the master must be taken with generous grains of salt.

Sincerely,

A handwritten signature in cursive script, appearing to read "Roger Peterson".

Roger Peterson
(ecologist, SRM member)

August 27, 1997

Bureau of Land Management

37-1 ☐ I would support Alternative # 1 if Guidelines # 14 and 15 were dropped. They do not allow for an increase in A.U.M. if improvements are put in.

37-2 ☐ I am completely opposed to Alt. #4.
Alt. 1 as amended is the favored over # 2 and 3.

Thank You
Robert L. Schluter
P.O. Box 1725
Alturas Ca. 96101

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Aug 27, 1997

Bureau of Land Management

I would support Alternative #1 if Guide lines #14 and 15 were dropped. They do not allow for an increase in A.V.M. if improvements are put in.

I am completely opposed to Alt. #4,

Alt. #1 as amended is the favored over #2 and 3.

Thank you

Ronald I. Schluter

P.O. Box 1725

Alturas Ca 96101

RECEIVED
BUREAU OF LAND
MANAGEMENT
AUG 27 1997



**Central Coast
Regional Water
Quality Control
Board**

81 Higuera Street
Suite 200
San Luis Obispo, CA
93401-5427
(805) 549-3147
FAX (805) 543-0397

August 29, 1997

Mr. Ed Hastey, State Director
United States Department of the Interior
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95825

Attention: Rangeland DEIS

Dear Mr. Hastey:

**RANGELAND HEALTH STANDARDS AND GUIDELINES FOR CALIFORNIA AND
NORTHWESTERN NEVADA, DRAFT EIS**

Thank you for the opportunity to review the draft EIS titles Rangeland Health Standards and Guidelines for California and Northwestern Nevada. We are pleased to see the Bureau of Land Management (BLM) propose four alternatives for select (BLM) holdings in California and Northwestern Nevada and support the BLM's proactive proposal. We encourage the BLM to implement proposed management practices for the protection and enhancement of water quality. The Central Coast Regional Board has jurisdiction over portions of the Caliente and Hollister Resource Areas. We have the following comments and questions:

- 38-1 1) All proposed alternatives for the Caliente and Hollister Resource Areas must comply with the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act, and the Central Coast Water Quality Control Plan. The Central Coast Water Quality Control Plan contains numeric and narrative objectives for the protection and enhancement of water quality.
- 38-2 2) All grazing activities shall be managed to achieve compliance with State water quality standards.
- 38-3 3) Implementation of targeted best management practices (BMP's) does not ensure compliance with State water quality standards. Although implementation of BMP's is an important tool in rangeland management, it may not preclude the need for implementation of additional BMP's and/or mitigation measures.

If you have any questions, please call Howard Kolb at (805)549-3332 or write to 81 Higuera Street, Suite 200, San Luis Obispo, CA 93401.

Sincerely,


for Roger W. Briggs
Executive Officer

Letter # 38, page 1

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Pete Wilson
Governor

Bureau of Land Management
California State Office
2135 Butano Dr.
Sacramento, CA 95825

FR: Willy Hagge, P.O. Box 62, Alturas CA. 96101

RE: Rangeland Health Standards & Guidelines Draft EIS

I appreciate the opportunity to comment on the proposed Standards and Guidelines for California and Northwestern Nevada. I have several concerns I hope will be addressed in the final document.

39-1 I support Alternative # 1, but only after some minor changes are implemented.

39-2 1. Guidelines # 14 & 15 the Transitional Guidelines need to be eliminated from the alternative. These guidelines basically eliminate the benefits of the thirteen guidelines that proceed these two and obviously would take away from the benefits derived from this alternative simply by the time and effort that would be needed to implement them. If there are problems with a grazing system these guidelines do not provide for the solution they are simply a stop gap measure. I want to see a site specific allotment analysis done before terms and conditions are decided upon. Please remove Guidelines 14 and 15 from Alternative # 1.

39-3 2. Chapter 2, page 20, Standard 2: Streams. Criteria to Meet Standard: The third item reads, The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter. I would like to see the scientific data that validates the reference to reduced icing in winter.

39-4 3. Chapter 2, page 19, third paragraph, second and third sentences. I believe this shouldn't apply to areas where significant juniper encroachment has occurred. The habitat could be improved remarkably with proper fire management or different types of control.

39-5 4. Chapter 2, page 19, Middle of fourth paragraph. The sentence reads, The Guidelines were designed to provide direction, yet offer flexibility for implementation through activity plans and Terms and Conditions for grazing permits. I feel that having the tool of flexibility is an important statement and needs to be in the final decision.

39-6 5. Chapter 2, page 20, Standard 3: Water Quality. The first sentence needs to have added at the end , " and is compatible with private water rights."

- 39-7 6. Chapter 2, page 22, Guideline 2: I feel that the desired seral state does not need to be determined in the Allotment Management Plan because the decision is always so subjective by the individual making the decision.
- 39-8 7. Chapter 2, page 21, Standard 4: Riparian and Wetland Sites. I support the language and idea presented under Exceptions and Exemptions to Standard 4 (where Standard 4 is not applicable). I would like to see this language remain in the Final Decision.
- 39-9 8. Chapter 2, page 19, Preamble. The first sentence of the preamble makes an important point of how our Healthy Rangelands are linked to the social and economic well being of rural communities in Northeastern California and Northwestern Nevada. I feel it is important to have this statement be in the final decision document.
- 39-10 9. Chapter 2, page 23, Guideline 11. I feel that fire needs to be utilized as a management tool and we strongly support guideline 11.
- 39-11 I strongly oppose Alternative # 4. This Alternative is simply a penalizing and punitive proposal directed toward the livestock grazing permittee which when implemented would economically impact the Public Lands Livestock grazing rancher significantly. The only management tool available is to impact the individual permittee, it does not allow for the improvements to go in and maintain the current AUMs with an improved grazing system. Also we beleive Alternative 4 violates the Taylor Grazing Act and the Public Rangelands Improvemnt Act.
- 39-12 I Like Alternative #1 over Alternative #2 and #3 because #1 has been localized by the RAC board and is sensitive to the local needs.
- 39-13 Chapter 4, page 21, Ranching Communities . I feel that you have sidestepped the impact issue you are trying to address in this section. If there is an impact to the industry then it needs to be stated as such. We don't want to see any type of broad statement which says, "To most ranchers, there will be no impacts to their traditional ranching lifeway through implementation of the grazing standards." The statement **Most Ranchers** could mean 51% of the ranchers in the USA. The impacts need to be specific to the BLM Public Lands Grazing Ranchers in California and Northwestern Nevada. The word *lifeway* can not be found in the dictionary and probably should be changed to read *way of life*. I suggest that the first sentence of this paragraph be deleted.

Sincerely, Willy Hagge

August 26, 1997

Bureau of Land Management
California State Office
2135 Butano Dr.
Sacramento, CA 95825

Attn: Rangeland DEIS

Dear Sirs:

I appreciate the opportunity to provide comments on the "Rangeland Health Standards and Guidelines for California and North Western Nevada" (DEIS), published in May 1997.

I have several suggestions and concerns that need to be addressed for the final document and decision notice.

40-1 (1) NEPA) requires agencies to analyze the direct and cumulative impacts of proposed actions while (DEIS) in most cases analyzes the direct impacts, it fails to analyze cumulative impacts of this and other actions (including the Federal Endangered Species Act).

40-2 (2) Nelson Ranch supports the idea that " for any standards, guide, term or condition to work, it must be capable of being achieved, based on SOUND SCIENCE or good common sense, and be measurable, understandable and economically feasible.

40-3 (3) Nelson Ranch also supports the preamble to the Susanville RAC, standards and guidelines that healthy rangelands and the social and economic well being of rural communities are linked.

40-4 (4) We will only support Alternative # 4 if guidelines # 14 and 15 are removed from Alternative # 4. If there are problems with a grazing system these guidelines do not provide for the solution they are simply a stop gap measure.

40-5 (5) Chapter 2, page 20 , standard #3 regarding water quality.
This statement is very vague and needs to be clarified. What does "original use" mean? What does "desired beneficial use " mean? If water quality is regulated by a State Water Resources Control Board, then this water must be applied to Beneficial Use only to protect private water rights.

40-6 (6) Chapter 2, page 22 guideline #2: "Desired seral states will be determined through the Allotment Management Plan". this statement needs further explanation For what reasons does this have to be determined through the Allotment Management Plan?

- 40-7 (7) Chapter 2, page 21, standard # 4. Riparian and wetland sites: Nelson Ranch supports the language and the idea presented under Exception and Exemption to standard 4 (where standard 4 is applicable). I would like to see this language remain in the final decision.
- 40-8 (8) Nelson Ranch strongly opposes Alternative #4. this alternative is a penalizing proposal directed toward the livestock grazing permittee which when implemented would impact the Public Lands Livestock grazing ranches significantly.
- 40-9 (9) Nelson Ranch prefers Alternative # 1 over Alternative # 2 and # 3 because #1 has been localized by the RAC Board and is sensitive to the local needs.
- 40-10 (10) Chapter 4, page 21, "Ranching community impacts and issues", needs further analysis because much of the data is incomplete.
- 40-11 (11) A Possessory Interest study should be included in the DEIS.
- 40-12 (12) Chapter #2, page 19: "The guidelines were designed to provide direction, yet offer flexibility for implementation through activity plans terms and condition for grazing permits". Flexibility is a very important part of the above quote, and FLEXIBILITY needs to be included in any final decision.

Thank you for the opportunity to comment on the Proposed Rangeland Health Standard and Guides for California Western Nevada.

Sincerely,


Stephen C. Nelson
Nelson Ranches

August 27, 1997

Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95827
Rangeland DEIS

To Whom it May Concern:

I am writing in regard to the "Rangeland Health Standard and Guidelines for California and Northwestern Nevada Draft EIS". My father and I are permittees in northeastern Lassen County and are directly effected by the proposed standards and guidelines.

41-1 [After reading the Draft EIS, I am concerned that the standards and guidelines are rather vague and generalized. They could be viewed and enforced in different ways by different individuals. If enforced to the letter they could well remove livestock entirely from Federal Lands or at least make it impossible for permittees to continue to operate. If used with a common sense approach in cooperation with livestock producers, improved range conditions would be achieved without undue hardships on livestock producers.

41-2 [The BLM needs to realize that ranchers have established methods of operation and even slight changes in AUMS, season of use, changes in turn-out dates, removal from grazing because of fires etc... have severe economic impacts. Such practices need to be held to a minimum when at all possible. Requiring extensive fencing and other expensive range improvements or time consuming tasks such as herding, could well be beyond the capabilities of smaller family owned ranches. Hopefully, any plans will be flexible and subject to compromise.

Forcing ranches into economic hardships or out of business should not be an option in any grazing plan. The loss of one home ranch to subdivision or non-farming uses has a much greater impact on wildlife, local economy etc.... than does the effect of grazing on hundreds of acres of range land.

41-3 [Alternative 4 should not be considered as a current option. The cuts in AUMS, the additional cost of implementation and adverse effects on rural economies would be too severe.

41-4 [The DEIS at several points states that grazing systems will be established after consultation with ranchers and others involved. However, the report states that there will be a 5,124 AUM cut in Lassen County for 5 years and a reduction of 8,877 AUMs in Washoe County. This is recommended even before the standards and guidelines have been adopted. Where and when were ranchers consulted about these cuts?

41-5 [The DEIS also makes no mention of an appeals process should there be a disagreement on any part of an established or proposed

41-5 | grazing system. There needs to be a period of time for
 cont. | permittees to respond to any changes before implementation.

41-6 | The standards and guidelines make reference to water quality
 standards but are vague as to how or what standards will be
 applied in rangeland conditions. Stock watering ponds should

41-7 | not have the stricter standards that are applied where humans
 make use of the water. Even then, unless livestock are proven
 to have a detrimental effect, the stricter standards should
 not be used to eliminate or reduce grazing in the area.

41-8 | The use of fire to affect grazing allotments is mentioned
 throughout the report. Prescribed burns are a management tool
 but often they get out of control and are dangerous for this
 reason. Many allotments have considerable amounts of private
 land interspersed throughout the allotment and make large burns
 impractical. The problem with the burns is that for a year
 or more afterwards no grazing is allowed in the burn area and
 as a result the entire allotment may be lost for use by the
 livestock producer. This can create severe hardship for
 ranchers, especially in areas where few sources of alternative
 grazing exist. Small burns that could be fenced off may be
 an answer in some cases but in no instance should a series of
 burns in one allotment be instituted for several years in a
 row.

41-9 | The definition of riparian area and the standards to be
 applied under different range conditions may be one of the
 biggest problems under any grazing system. Cattle are going
 to use the greener riparian areas before any others. To judge
 the utilization of the allotment based on the stubble height
 of riparian areas would be an injustice to livestock producers.

41-10 | Fencing and development of alternate water sources are the only
 way to effectively preserve riparian areas but, common sense
 must be applied. To remove all cattle from the entire allotment
 because a small riparian area is over-grazed should not be the
 answer. Standards and guidelines must be flexible enough to
 realize this.

This letter, I realize, is somewhat on the negative side.
 There is a feeling in the ranching community that the Federal
 Government is trying to remove grazing from public lands. Every
 new plan of action almost always suggest cuts in AUMs, reducing
 season of use or requiring fencing or herding, expensive options
 to the permittees. Rather than compromise or working to increase
 or maintain current grazing levels the attitude of government
 seems to be to reduce and remove. Once grazing is eliminated
 the home ranchers are likely to be gone also. The impact on
 local economies, wildlife and the quality of life in these rural
 areas is likely to be significant. Strict and unreasonable
 interpretation and enforcement of standards and guidelines should
 not be the answer.

Respectively yours,

George Bailey Jr.
 George Bailey Jr.

Modoc County Cattlemen's Association



Letter # 42, page 1
202 WEST FOURTH STREET
ALTURAS, CALIFORNIA 96101
████████████████████
(916) 233-6400

August 28, 1997

Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, CA 95825

Re: Rangeland Health Standards & Guidelines Draft EIS

The Modoc County Cattlemen's Association (MCCA) appreciates the opportunity to comment on the proposed Standards and Guidelines for California and northwestern Nevada. MCCA has several concerns and ideas that we would like to direct your attention to and some questions we would like answered.

MCCA will support Alternative #1, but only after some minor changes are implemented.

42-1

1. Guidelines 14 & 15., the Transitional Guidelines, need to be eliminated from the alternative. These guidelines basically eliminate the benefits of the thirteen guidelines that proceed them, and obviously would take away from the benefits derived from this alternative simply by the time and effort that would be needed to implement them. If there are problems with a grazing system these guidelines do not provide for the solution, they are simply a stop gap measure. MCCA wants to see a site specific allotment analysis done before terms and conditions are decided upon. Please remove Guidelines 14 and 15 from Alternative #1.

42-2

2. Chapter 2, page 20, Standard 2: Streams. Criteria to Meet Standard. The third item reads: **The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter.** MCCA would like to see the scientific data that validates the reference to reduced icing in winter

42-3

3. Chapter 2, page 19, third paragraph, second and third sentences. MCCA believes this shouldn't apply to areas where significant juniper encroachment has occurred. The habitat could be improved remarkably with proper fire management or different types of control.

42-4

4. Chapter 2, page 19, Middle of fourth paragraph. The sentence reads: **The Guidelines were designed to provide direction, yet offer flexibility for implementation through activity plans and Terms and Conditions for grazing permits.** MCCA feels that having the tool of flexibility is an important statement and needs to be in the final decision.

42-5

5. Chapter 2, page 20, Standard 3: Water Quality. The first sentence needs to have added at the end: "and is compatible with private water rights."

42-6

6. Chapter 2, page 22, Guideline 2. MCCA feels that the desired seral state does not need to be determined in the Allotment Management Plan because the decision is always so subjective by the individual make the decision.

42-7

7. Chapter 2, page 21, Standard 4: Riparian and Wetland Sites. MCCA supports the language and idea presented under Exception and Exemption s to Standard 4 (where Standard 4 is not applicable). MCCA would like to see this language remain in the Final Decision.

42-8

8. Chapter 2, page 19, Preamble. The first sentence of the preamble makes an important point of how our Healthy Rangelands are liked to the social and economic well being of rural communities in northeastern California and northwestern Nevada. MCCA feels it is important to have this statement in the final decision document.

Bureau of Land Management
Rangeland Health Standards & Guidelines Draft EIS
August 28, 1997
Page 2

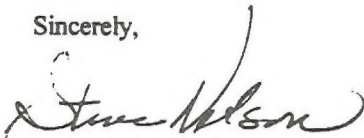
42-9 9. Chapter 2, page 23, Guideline 11. MCCA feels that fire needs to be utilized as a management tool and we strongly support Guideline 11.

42-10 MCCA strongly opposes Alternative #4. This Alternative is simply a penalizing and punitive proposal directed toward the livestock grazing permittee which, when implemented, would economically impact the Public Lands Livestock grazing rancher significantly. The only management tool available is to impact the individual permittee. It does not allow for the improvements to go in and maintain the current AUMs with an improved grazing system. Also, we believe Alternative 4 violates the Taylor Grazing Act and the Public Rangelands Improvement Act.

42-11 MCCA like Alternative #1 over Alternative #2 and #3 because #1 has been localized by the RAC board and is sensitive to the local needs.

42-12 Chapter 4, page 21, Ranching Communities. MCCA feels that you have sidestepped the impact issue you are trying to address in this section.. If there is an impact to the industry, then it needs to be stated as such. We don't want to see any type of broad statement which says "To most ranchers, there will be no impacts to their traditional ranching lifeway through implementation of grazing standards." The statement Most Ranchers could mean 51% of the ranchers in the USA. The impacts need to be specific to the BLM Public Land Grazing Ranchers in California and northwestern Nevada. The word lifeway cannot be found in the dictionary and probable should be changed to read way of life. MCCA suggests that the first sentence of this paragraph be deleted.

Sincerely,



Steve Nelson
President
Modoc County Cattlemen's Association

August 29, 1997

To Whom it Concerns:

As a member of the Susanville Resource Advisory Council, I am pleased to make some personal comments.

As it has been said many times in our council meetings and by BLM personnel, our ranges are in better condition now than any time in probably the last 80 or 90 years.

I agree that we do have allotments that need help, but without a lot of funding, it will be impossible to bring some allotments up to meet the new "standards and guidelines" without causing drastic economic hardships to several permittees. It is a fact that BLM and livestock permittees are short of money! This brings my concerns to comment on several of them.

43-1 I would choose "Alternative # 1" because it is the one we worked so hard on as a RAC board, although there are things in it I am not comfortable with.

43-2 Chapter 2, page 24, guideline # 14. The most abused allotments are being managed and are getting priority for improvements now, but there just isn't enough money to do what is needed. That won't change with "Rangeland Reform, Standards and Guidelines". Number 14 will cause additional workload for BLM staffers to investigate complaints turned in by (cowcops) environmentalists.

43-3 Chapter 2, page 20, reforms to flexibility for implementation. This is a must.

43-4 Chapter 2, page 24, guideline # 15 is necessary for local conditions and permittee involvement.

43-5 Chapter 4 refers to economics. I am uncomfortable with the economic study because the Altures Resource Area was not included. There are AUM's in Lassen and Washoe Counties that will have a greater impact than I feel was shown in Chapter 4.

43-6 The Standards and Guidelines should and must not cause economic hardships to permittees and local counties. We have the knowledge and expertise to create more AUM's. Lets do that rather than put a family ranching business out of business.

Thank you,
Ken McGarva

Ken McGarva for McGarva Ranch
P.O. Box 116
Likely, CA. 96116

August 29, 1997

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page 2.

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Thank you,

Ken McGarva

KEN MCGARVA for MCGARVA
P.O. Box 116 RANCH
LIKELY, CA. 96116

John Espil Sheep Co., Inc.

John and Carolyn Espil
P.O. Drawer N
Susanville, CA 96130

Brent and Vicki Espil
P.O. Box 150
Gerlach, NV 89412-0150

August 31, 1997

Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, California 95825

ATTN: Rangeland DEIS

Dear Sirs:

The John Espil Sheep Co., Inc. is a family-owned corporation permitted cattle and sheep use on the public lands within the Susanville, California District of the Bureau of Land Management. We make these comments regarding the DEIS:

1.1 BACKGROUND:

1. The document references the Taylor Grazing Act. Besides the referenced direction cited in the document, the TGA also provided that the Grazing Service (BLM) would safeguard the preference of the permittees upon the public lands. We expect that any standards and guidelines implemented under the regulations, now or in the future, will do so.

1.7 ASSUMPTIONS:

44-1 2. Assumption #3 uses the phrase "as the lands are determined available for livestock grazing use", implying that such determination has not been made. Contrary to this implication, the lands which encompass our grazing allotments lie within Grazing Districts, and such determination has therefore already been made.

44-2 3. Assumption #5 uses the phrase "monitoring or verified observation indicates management changes are needed". We support scientifically valid monitoring. The phrase "verified observation", however, is not defined either in the glossary or, so far as we know, in the regulations. It is therefore a nebulous term. Observations which are not scientifically valid should not be used to "determine" a need for change. This is especially important to us because our family has been subjected to full-force-and-effect decisions by a former District Manager based upon political motivations which were not supported by scientific monitoring, and it was only the scientific monitoring of the BLM itself which helped us defeat his efforts. The

economic cost to us in defending our permit against his actions, however, was staggering. The science of range management, the legal requirements of BLM, and common decency should not permit anything less than the best science to prevail.

44-2
cont.

We request that the phrase "verified observation" be removed from both the letter and the spirit of the final EIS and implementation of the S&Gs. Furthermore, such scientific monitoring, in order to determine "progress toward" accomplishment of the S&G's, must be conducted by range studies made over time. An "instantaneous" evaluation, conclusion and determination should not be permitted.

44-3

4. Assumption #7 uses the phrase "all implementation will be coordinated and in consultation with the affected grazing permittees/lessees...." This implies that monitoring and decision-making will not be conducted with such coordination and consultation with the permittees, but only once a decision is made, the implementation will be coordinated and consulted. This is wrong. All phases of monitoring, evaluation, analysis, interpretation, decision-making, and implementation must be made with full coordination, consultation, and cooperation with the permittees.

1.10 CALIFORNIA DESERT CONSERVATION AREA:

44-4

5. We believe the approach taken and accepted for the CDD is the appropriate approach, because rangeland "health" is affected by much more than the presence or absence of livestock: it is also affected, and in many cases, much more affected, by wild horses and burros, recreation, fishing, hunting, camping, and other non-livestock-related issues. We believe the existing grazing regulations regarding rangeland health fall far short of recognizing such impacts, and what is appropriate for livestock management is and should be appropriate for other uses of the public range. This is recognized by the document, but no analysis is made.

2.1 INTRODUCTION:

44-5

6. The document errs in not considering a "no action" alternative. The document recognizes that most of the existing land use plans (LUPs) comply with the fundamentals of rangeland health. The regulations do not require that the LUPs comply with standards and guidelines, but rather with the fundamentals of rangeland health. Once this is recognized, there exists no need to artificially amend the existing LUPs which are already in compliance with the fundamentals. This, then, should serve as the basis of the "no action" alternative where those LUPs are in compliance. Where a particular LUP is not in compliance, then it should be brought into compliance with the fundamentals.

2.4 IMPLEMENTATION - Screening:

44-6

7. This section uses the phrase "available data and the professional judgment of the staff." As long as the "and" ties the professional judgment of the staff to the available data, we do not object. However, professional judgment is not possible without monitoring conducted over time. The best professional, if he is new to an

44-6
cont. [area or allotment, cannot know if progress has been made toward meeting a particular S&G without reference to past monitoring data and history of the allotment.

2.4 IMPLEMENTATION - Management Change:

44-7 [8. The phrase "ecosystem position, resource risk, biological values" is not defined. However, the phrase itself identifies these as societal value judgments which are not properly left to the "staff", but must instead be made by public involvement, including scoping and all other NEPA requirements.

44-8 [Prior to making final any "prioritization" and acting upon it, BLM must expose such prioritization to public involvement through the NEPA process.

2.4 IMPLEMENTATION - Inventory and Assessment:

See Response 44-7 [9. The phrase "ecosystem position, resource risk, biological values" is not defined. However, the phrase itself identifies these as societal value judgments which are not properly left to the "staff", but must instead be made by public involvement, including scoping and all other NEPA requirements.

See Response 44-8 [Prior to making final any "prioritization" and acting upon it, BLM must expose such prioritization to public involvement through the NEPA process.

44-9 [In addition, a step must be added between steps 2 and 3. Once an inventory occurs, MONITORING over time must be conducted to determine what causes result in what effects. Only with scientifically valid data can step 3 then occur. The document as it is written pre-concludes that livestock are the cause of any effect, and that pre-conclusion is biased. Furthermore, an unknown or unrelated cause (e.g. flash flooding or 1000-year precipitation events) may result in the non-achievement of a S&G at the point of inventory, but monitoring conducted over time may show that the existing livestock management is sufficient in improving a condition inventoried at a point-in-time.

2.4 IMPLEMENTATION - Prioritization:

[10. This section references Appendix 6, which is a flow chart showing the implementation process.

44-10 [This flow chart should be modified to separate Trend Unknown from No Upward Trend. This is necessary to prevent an unnecessary decision and hardship upon a grazing permittee simply for lack of data on BLM's part. As written, if BLM has no data confirming trend, the assumption is that no trend is occurring. Therefore, a lack of monitoring by BLM will potentially be used to create adverse decisions upon a permittee, when in fact an upward trend is occurring and would be supported by the missing monitoring data.

44-10
cont. "Trend Unknown" should flow to "Monitor", which should flow back to "Existing Situation".

We assume that "Monitor" as used in this flow chart means "monitoring based upon rangeland studies conducted over time". If our assumption is wrong, then the flow chart should be modified to say "Monitor based on rangeland studies conducted over time".

2.5 ALTERNATIVE 1: STANDARDS AND GUIDELINES PROPOSED BY THE RESOURCE ADVISORY COUNCILS:

44-11 11. Generally, we support this alternative over the others because it is area-specific and developed by people more familiar with our area. The S&Gs are therefore more applicable here than would statewide or other S&Gs. Our support for this alternative, however, is conditional upon changes made to the S&Gs for Susanville (Section 2.53) as listed below.

2.53 SUSANVILLE RAC RECOMMENDED STANDARDS AND GUIDELINES:

Standard 1.

44-12 12. The criteria regarding Standard 1 should be eliminated. Rills, gullies, pedestalling, scour and sheet erosion are all natural features of the landscape. Their presence or absence is not indicative of any necessary cause and effect relationship with livestock grazing. Furthermore, their presence at any point in time would not indicate, even if there existed a connection between these features and livestock grazing, that the present livestock grazing has anything to do with their occurrence on the landscape.

44-13 Secondly, the vigor and diversity of species, the potential natural vegetation, or whether or not the "desired" species are present, have nothing to do with infiltration and permeability rates of soils. A soil can exhibit the same infiltration rates (or improved) under cheatgrass or other exotic species as it can under the "natural" vegetation.

Standard 2.

13. The criteria regarding Standard 2 should be modified to read :

44-14 * Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized over time by woody or herbaceous riparian species.

* Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during normal annual high stream flow events (excluding 100- or 1000-year events).

44-14
cont.

* The stream water surface has a high degree of shading for the potential of the site, resulting in potentially cooler water in summer and potentially reduced icing in winter.

* Portions of the primary floodplain, if present, are frequently flooded (inundated every 1-5 years), with normal precipitation fluctuations.

Standard 4.

14. The standard should be modified to read:

Seventy-five percent of riparian and wetland areas are in properly functioning condition or if functioning-at-risk, have a static to upward trend.

15. The meaning should be modified to read:

The riparian and wetland vegetation and/or rock is controlling erosion,

16. The criteria should be modified to read:

* Riparian vegetation is vigorous . . . sufficient to stabilize stream banks and shorelines, in conjunction with rock and other stabilizing features.

* Riparian vegetation and large woody debris (if applicable) are well anchored and capable of withstanding normal annual high stream flow events (excluding 100- and 1000-year events).

* Negligible accelerated erosion as a result of ongoing grazing practices is evident.

* (no change).

17. We agree with the exceptions and exemptions to Standard 4.

Standard 5.

18. The standard should be modified to read:

Healthy, productive and diverse populations of native and other desirable plant and animal species, including special status species, are maintained.

Guideline 1.

19. The guideline should be modified to read:

Where herbaceous species control the functioning and erosion of a stream reach or significant portion thereof, sufficient herbaceous stubble will be present at the end of the growing season, or at the end of the grazing season if grazing occurs after fall dormancy. The residual or regrowth should provide sufficient herbaceous forage biomass to meet the requirements of plant vigor maintenance, bank protection, and sediment entrapment.

44-19 Utilization of stream-side herbaceous plants should be limited to 80% utilization of the current year's total growth, and utilization of stream-side woody plants should be limited to 50% utilization of the current year's total growth, and/or livestock should be removed to allow sufficient time for plant regrowth.

44-20 a. Late season use (summer or fall grazed pastures) may or may not require more restrictive utilization based on site specific situations.

b. (no change).

44-21 c. Hoof action impacts or chiseling on stream banks will not exceed a level (specific to the site) which results in a decline in bank stability for the reach of stream or significant portion thereof.

Guideline 2.

44-22 20. The phrase "generally the goal will be to achieve Potential Natural Communities in the riparian zone" should be eliminated from this guideline, because potential natural communities ("pristine" conditions) are not beneficial to many species of wildlife which use the riparian zone in one way or another. If a "condition" statement is to be included, it should recognize that a mosaic of vegetation seral stages and conditions in riparian areas, as in the uplands, will likely result in the most diverse and abundant plant and animal communities.

Guideline 3.

44-23 21. The phrase "and during critical times of plant growth" should be eliminated from this guideline.

First, complete "rest" is not necessary during any stage of growth of the plant. Secondly, "critical times" could potentially be construed to mean any time of the plant up to and through dormancy. Combined with complete rest, this could be construed to mean that all of the livestock permittees are out of business, because potentially no grazing would be permitted for most of the year, and especially during the green period which is so critical to livestock and wildlife performance and growth. Third, wild animals graze during times of "critical times" of plant growth, and there is no reason why domestic animals should arbitrarily be prohibited from doing so.

Guideline 4.

44-24 22. The phrase "so that overall use does not detract from the goal of achieving rangeland health" should be eliminated from this guideline.

Because these regulations and S&Gs affect livestock only, the implication of the above phrase is that if "overall use" does result in detracting from the goal of rangeland health, that livestock would be the use to "move over" or "get off". This is unfair and is wrong, and such a conclusion would be a violation of BLM's mandate to protect the grazing preference of the permittee.

Guideline 5.

23. The phrase "potential natural vegetation or" should be eliminated from this guideline.

44-25 The existing LUPs already call for various seral conditions and trends. In some cases, this "desired plant community" is the potential natural vegetation ("pristine conditions"), and in other cases it is something else, but in all cases, BLM has already defined what is the "desired plant community".

Guideline 8.

24. This guideline should be eliminated because it subjugates livestock use to another use. In the alternative, it should be modified to read:

44-26 Livestock grazing plans will consider the coordinated needs of livestock management together with site-specific wildlife habitat needs, and coordinated management plans will be developed.

Guideline 11.

25. This is not a livestock management S&G. It should be eliminated or, in the alternative, should be modified to read:

44-27 Prescribed fire and (natural) prescribed fire will be integrated with grazing management to promote a mosaic of healthy plant communities and vegetation diversity. Where prescribed or natural fire is used, it should be designed and implemented so as to be the least obtrusive to the permitted livestock use.

Guideline 13.

26. This guideline should be eliminated due to its potential infringement on private water rights and permitted grazing use. In the alternative, it should be modified to read:

44-28 Development of springs, seeps, and other water-related projects shall be designed to promote rangeland health, livestock management, and wildlife management. Wherever possible, water sources (excluding wells, 'warm-weather' pipelines, private, and private water-righted waters) shall be available year long for use by wildlife. However, the livestock permittee shall not be responsible for the maintenance of available water at any location or time outside his area of use or time of use.

Guideline 14.

27. This guideline should be eliminated, for a number of reasons.

44-29 First, it is premised and written to imply that all livestock practices are abusive, but it will only focus on the "most abusive". This is an inherently biased approach, and one that is absolutely unjustified.

44-29
cont. Second, the regulations require the authorized officer to take action not later than the next grazing season when a determination is made that grazing practices on an allotment are in non-compliance with the S&Gs, regardless of the time or regardless of the allotment. The premise of this guideline is that "we know its happening, we just haven't discovered it yet, so let's assume that everywhere we haven't looked must be being 'abused'". The premise is biased, and is untrue, and is contrary to the written regulation.

Third, in a realistic sense, the time and manpower it will take to enforce this "interim" guideline would be better invested in monitoring, evaluation, interpretation, and management action on the allotments themselves.

44-30 Fourth, a variety of monitoring methods exists which are far superior and demonstrably more accurate than the "Landscape Appearance Method" of determining utilization. One such method for herbaceous species is the Height:Weight Method. It should be used wherever possible, rather than the subjective Landscape Appearance Method. If the Landscape Appearance Method is used, we insist that BLM or any others using it couple it with objective, rather than subjective, and quantitative, rather than "qualitative" monitoring.

44-31 Fifth, utilization higher than 60% on herbaceous species has been documented to result in no harm to the health of riparian areas. Likewise, utilization levels higher than 50% on upland species have been documented to result in no harm to the health of the uplands. In some instances, utilization up to 85% in rest-rotation management systems has resulted in improved ecological condition.

Sixth, there is no reasonable reason to limit utilization to the arbitrary level of 20% on "key browse species". Livestock and deer diets do not depend upon a single species or a couple of species, but are greatly varied and include a very wide diversity of forage species. To create such an arbitrary standard on one or two plant species and impose it on the livestock operation would be wrong. Additionally, monitoring by Nevada Division of Wildlife in a neighboring allotment to ours has shown utilization of bitterbrush (a key browse species) BY RESIDENT DEER WHEN NO LIVESTOCK HAVE BEEN PRESENT, TO EXCEED 90% UTILIZATION. The imposition of the guideline would arbitrarily punish livestock operators for "excesses" which may very well be caused by wildlife itself.

See
Response
44-29

The "interim" guideline is no more than a police action, and the letter and intent of the regulations are toward improving management, not policing the range. We support (and always have) the former. We oppose the latter.

2.6 ALTERNATIVE 2. STATEWIDE CONSISTENCY / CONSOLIDATED STANDARDS AND GUIDELINES.

44-32 29. This alternative shares some of the same drawbacks in wording as does the Susanville RAC S&Gs. We support the more area-specific S&Gs of Susanville, with the above-noted conditional changes. Where wording is similar between Alternative 1 and 2, we propose the changes noted above in reference to Alternative 1 be made if Alternative 2 is adopted.

44-33 In addition to the above applicable changes, the phrase "and meeting management goals" should be eliminated from the Standard for Riparian and Wetland Areas at the bottom of Page 25, Chapter 2. In addition, the phrase "There is a diversity of insects and amphibians" should be eliminated from the "As indicated by" section on Page 26, Chapter 2.

44-34 Finally, all references to "microphytic or cryptogamic soil crusts" should be eliminated at this time. The existing scientific standard to describe rangeland vegetative potentials is the Natural Resources Conservation Service (formerly Soil Conservation Service) Range Site Descriptions. To our knowledge, these do not include a description of, or potential in each site description for, such crusts. Therefore, until more scientific knowledge exists to incorporate the known vegetative potential with a known potentials for cryptogamic crusts by range site type, any such standard or guideline should be deferred. To do otherwise would be to impose a potentially arbitrary standard or guideline.

2.8 ALTERNATIVE 4. RAPID IMPROVEMENT/RECOVERY STANDARDS AND GUIDELINES.

44-35 30. This alternative should be eliminated from further consideration. The document at Chapter 5, page 3 makes note that BLM approached the California Native Plant Society, Natural Resources Defence Council, and Range Watch, for their "input" to develop this alternative. All of which have what we consider to be biased anti-livestock agendas. This alternative is not, therefore, a representation of scoping for the document at all, but rather the "anti-livestock" alternative. We must question why livestock interests were not "approached" by BLM for the development of a "rapid improvement/recovery" alternative.

44-36 Additionally, the entire approach of the body of the alternative makes the erroneous assumption that removal of livestock is the "cure" to any real or perceived "problems".

44-37 There exist an abundance of research articles and publications written by professionals who are actually employed in researching and monitoring the West, and an abundance of these articles and publications refute entirely the purported position of Holechek as it is cited in this document. To develop an entire alternative on two articles written by a single author is to ignore the applicable data and research available to the BLM. We consider this a completely biased approach. Finally, the simplistic conclusion attributed to Holechek that 50% utilization in most cases "causes range destruction in the rugged arid ranges of the West." is refuted by the abundance of data and research to the contrary. It also does not account for the myriad of grazing strategies that have been successfully applied in the West. Winterfat, for instance, has been documented to maintain and improve with utilization in the heavy to severe range if used during the dormant winter period. Another example is that allotments with rest-rotation have improved with heavy and severe utilization during the green and dormant periods, because the rest and deferment built into the system more than account for such heavy and severe utilization levels.

44-38 If this alternative is not eliminated from further consideration, we request that we, other livestock permittees, and livestock associations and organizations, be permitted 120 days to develop and submit a "Rapid Improvement/Rapid Recovery Standards and Guidelines" alternative which would then be submitted to BLM for inclusion in this NEPA process, prior to the development of a Final EIS.

COMMENTS SPECIFIC TO OUR GRAZING ALLOTMENTS:

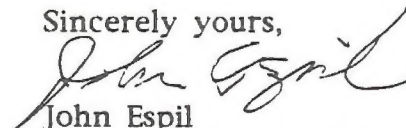
44-39 31. Because of the general nature of the document, and the non-specificity to conditions on our grazing allotments, we are unable to make further comment regarding the analysis of the alternatives as they may be applied in the future.

44-40 We will note, however that the last monitoring evaluation by BLM of our Twin Peaks Allotment showed a marked improvement in ecological condition at several of the monitoring locations; 88% of the riparian areas in functional condition with a static, upward, or "proper functioning" status; and slight to light utilization throughout the majority of the allotment. These improvements were made possible by a cooperative management approach taken by BLM and us in the early 1980's, in which we learned some from the BLM personnel, and they learned some from us, in the development of our Allotment Management Plan. This AMP included deferred grazing management, rotation of livestock to various areas of the allotment at different times, spring developments, etc., and was based on a recognition by BLM that our economic stability is crucial to making any management plan successful. The politics of BLM in the 90's has occasionally resulted in the departure from that cooperation and recognition by "mid-management" in BLM, but we have continued to work with the field people in the continued management of the allotment based upon sound science and economics. We greatly appreciate BLM's on-the-ground efforts and cooperation. All of this occurred long before the notion of "rangeland reform" and "standards and guidelines" became the vogue. We believe the implementation of "standards and guidelines" to be largely an unnecessary bureaucratic exercise, and one which detracts BLM from their monitoring and management efforts on the ground, to the benefit of all resources and resource users.

We look forward to the continued coordination, cooperation, and consultation by BLM with us in the management of all of our BLM allotments.

Thank you.

Sincerely yours,



John Espil

President, John Espil Sheep Co., Inc.



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Eagle Lake Resource Area
2950 Riverside Drive
Susanville, California 96130

In Reply
Refer to:
1784
(CA-320)

Bureau of Land Management
2135 Butano Drive
Sacramento, CA 95825-0451
Attention: Rangeland DEIS

To Whom it May Concern:

The Ukiah Resource Advisory Council, at its meeting July 24, 1997, adopted the following comments to the Bureau of Land Managements draft environmental impact statement on Rangeland Health Standards and Guidelines. The council directed that these comments, numbered 1 and 2, be submitted as part of the public comment on this DEIS:

45-1

1. The Ukiah (Northwest California) Resource Advisory Council recommends that the BLM's final environmental impact statement on Standards for Healthy Rangelands and Guidelines for Livestock Grazing contain a monitoring component. This component should provide procedures for BLM managers to track the effectiveness of the Standards and Guidelines in meeting the overall goal of improving the health of rangelands administered by the BLM and sustaining the well being of the communities dependent upon these lands. The BLM should consider the work of the Klamath Province Collaborative Learning Circle in development of a monitoring component. This monitoring component should include ecological, social, cultural and economic considerations.

45-2

2. The council notes that Alternative One was developed with the full participation of the resource advisory councils (in California). The fourth alternative lacked the same broad based review. Because the fourth alternative was not developed with the same RAC involvement as the other alternatives, the council recommends that RAC members (in California) have the opportunity to review and modify the proposed fourth alternative in the final EIS should it be considered for adoption.

Thank you for your attention to this matter. Please call me at (916) 257-5381 if you have questions.

Sincerely,

Joseph J. Fontana
Public Affairs Officer



Lassen County Farm Bureau

P.O. BOX 151 TELEPHONE (916) 257-7242
SUSANVILLE, CALIFORNIA 96130

Bureau of Land Management
California State Office
2135 Butano Dr.
Sacramento, CA 95625

Comments Rangeland DEIS

Dear People,

The Lassen County Farm Bureau would like to put forth these comments on the "Rangeland Health Standards and Guidelines for California and Northwestern Nevada" Draft Environmental Impact Statement (DEIS) published in May of 1997. We would like to point out of our areas of concern and will include suggestions that we feel you should direct toward the final document and notice of decision.

We believe the continued trend of improved resource conditions demonstrates permittees and BLM should look at this as a indicator of the cooperation and effort both have made over the last 20 years. We hope these new standards are implemented in a way that continues this positive trend.

Chapter 1: Introduction

- 46-1 The analysis rangeland health should also include causes of unhealthy conditions such as roads, wild horses and burros, recreation and camping, ATV's and any other uses. Although this document is for grazing only, grazing does not contribute to many problem areas where the above mentioned forces are the causing factor. We do not feel removal of livestock is the answer to
- 46-2 arbitrary resource damage. Removal of livestock cannot be the preferred method of addressing rangeland problems as seems to be the cause in these 4 alternatives. Further efforts should be
- See Response 46-1 made to manage some of the other impacts mentioned above.

Chapter 2: Description of Alternatives

- 46-3 We agree with the preamble in the Susanville RACs standards and guides that notes healthy

August 30, 1997

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ASD		
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Supt Svcs		
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Library _____		

-2-

46-3
cont.

rangelands and social and economic well beings of rural communities are linked. Rural communities are suffering with economic woes and we hope these standard can be implemented in a way as to not increase the economic blight.

46-4

We feel the strategy of implementing these guidelines is very subjective. Since BLM allows that they cannot provide the personnel or financial resources to evaluate every allotment and will allow judgments to be based on available data and professional judgment: we feel determinations will be made that do not accurately portray the on the ground conditions. Decisions will be forced on public pressure. It would be more efficient to add these guides and standards to permits as they are renewed or issued. It would also help continue the climate of cooperation.

Alternative 1

46-5

We support this alternative. We feel the stubble height for stream sides areas is realistic. Local management decisions is appropriate here. We also support guideline 4. We question the

46-6

authority and need for the transitional guidelines (guideline 14) proposed by the Susanville RAC. The agency already has this authority to deal with serious resource problems. This should be eliminated.

Alternative 3

46-7

This alternative is less comprehensive than 1. We do not think several of the fall back guidelines are proper and should not be included, specifically 11. Permittees need to be included in decisions.

Alternative 4

46-8

This alternative uses the incorrect assumption that removal of livestock provides rapid improvement in degraded resources. It does not take into account the many other factors which affect rangeland resources. Nothing has documented that livestock exclusion increases the rate of recovery. Guideline 2 is confusing and should not be used. We feel a rigid stubble height of 4 to

46-9

6 inches should be changed. This alternative is very costly and should be eliminated because it

46-10

could not be supported by agency budgets.

-3-

Chapter 3: Affected Environment

- 46-11 The chapter needs to include the benefits of range improvements such as springs, wells, and off-stream water developments for wildlife. This is a huge benefit to the resource area. When referring to the past conditions of the Great Basin the term "pristine" is used. Those pristine conditions existed with grazing. Today the larger forces seem to be lack of natural fire and intense human impact which are not examined. The DEIS states that riparian areas absorb much recreation activity. They also tremendously degrade these areas as well which needs to be included. We also noted the range is supported 45 percent more wild horses than the agency's target figures. Their impact needs to be included because their overpopulation greatly affects rangeland condition.
- 46-12

Chapter 4: Impact Analysis

- 46-13 Alternative 3 should be eliminated because it fails to address fully watershed function, nutrient cycling, and energy flow. Chapter 4 needs to recognize that removal of grazing is not the only management tool available. It is misleading to assume that this alternative will provide the fast recovery. Wild horse and burro overgrazing needs to be addressed in this analysis. They create many problems than livestock producers get blamed. For any standards and guides to be successful horses and burros must be managed accordingly. Recreational uses also degrade resources and they should be following the same standards by which permittees are held. We also feel BLM should analysis the impacts of conversion of rangelands to development as ranchers are forced off their permits.
- 46-14
- 46-15
- 46-16

Conclusion

Lassen County Farm Bureau supports continued responsible grazing of BLM lands because of the economic value it contributes to our community. We hope that new standards and guidelines can be implemented in a manner to continue the upward trend in range conditions as well as continue the viability of the ranching operation. Thank you for considering our comments.

Sincerely,

Hannah Tangeman-Cheney
Hannah Tangeman-Cheney, President
Lassen County Farm Bureau



**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION**

415 Knollcrest Drive, Suite 100
Redding, CA 96002
Phone (916) 224-4845
FAX (916) 224-4857

Letter # 47, page 1

Cal/EPA



Pete Wilson, Governor

5 September 1997

Bureau of Land Management
California State Office
2135 Butano Dr
Sacramento, CA 95825

SUBJECT: RANGELAND DEIS

We have reviewed the May, 1997 draft EIS for Rangeland Health Standards and Guidelines for California and Northwestern Nevada. Our comments follow.

Through state and national policy directives, it is apparent that BLM is committed to the long-term health of public rangelands including protection and restoration of streams, wetlands and riparian areas. We support this direction and this commitment. Through our involvement in recent years with BLM sponsored stewardship programs and restoration projects, we have seen significant improvements in water quality and aquatic habitat conditions in streams such as Fitzhugh Creek in Modoc County, and Cedar Creek in Lassen County. These programs and projects provide an example of what can be achieved through proper management direction and the cooperative efforts of permittees, resource agencies and environmental interest groups. Hopefully, through the provisions of "Rangeland Reform '94", and the adoption of these rangeland standards and guidelines, we will see continued watershed improvements.

The draft EIS contains four alternatives for establishing rangeland standards and guidelines. However, the actual standards and guidelines under the four alternatives are similar, and as stated in Chapter 4 (Impact Analysis), all would result in enhancement of water quality, riparian, and wetland conditions. Our review focused on the standards and guidelines recommended by the Susanville RAC. Standards and compliance criteria are listed for streams, water quality and riparian/wetland sites. While we generally concur with the standards, it should be noted that they are mostly qualitative and opinions may differ on whether the standards are being met. Regardless, the narrative criteria do provide a reasonable basis for interpreting standard compliance and for guiding management decisions. Under Standard 3:

47-1 Water Quality, we recommend adding a nondegradation statement (i.e. maintain existing high quality) in addition to "at a minimum, maintain water quality adequate to protect existing and potential beneficial uses." Criteria to meet this standard should include compliance with adopted state water quality standards in addition to the narrative criteria listed for streams, riparian and wetland areas.

47-2 The standards are followed by guidelines which describe practices or methods to be used to ensure that grazing management activities meet standards. The guidelines are similarly qualitative but provide that



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BLM Rangeland DEIS

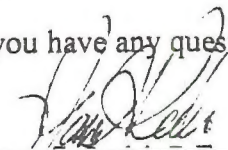
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5 September 1997

47-2
cont. site-specific measurable terms and conditions (e.g. utilization standards) will be included in individual grazing permits. We concur with this approach.

47-3 In summary, we concur with the Rangeland Health Standards and Guidelines set forth in the draft EIS. It has been our experience however, that water quality and watershed improvements will mostly depend on the commitment and capability of BLM to conduct watershed assessments, monitor livestock cause and effect relationships, establish and/or participate in collaborative management approaches (i.e. CRMs, stewardship programs) and implement management change where appropriate.

If you have any questions, please contact Dennis Heiman at (916)224-4845.


James C. Peuri, P.E.
Assistant Executive Officer

DHR:vmg

cc: District Manager, BLM Susanville District
Area Manager, BLM Alturas Resource Area
Area Manager, BLM Redding Resource Area

APPENDIX B -- LETTERS RECEIVED

This appendix contains the entire text of the comment letters received by BLM from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service on the Draft EIS on Rangeland Health Standards and Guidelines for California and northwestern Nevada.

Both agencies have agreed that any consultation, per Section 7 of the Endangered Species Act, will be conducted for site-specific projects rather than through this EIS.

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IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

1-1-97-I-2013

August 21, 1997

Memorandum

To: State Director, Bureau of Land Management, Sacramento, California

From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Review of Draft Environmental Impact Statement (DEIS) on Standards for Healthy Rangelands and Guidelines for Livestock Grazing on Public Rangelands in California

In response to your request of May 28, 1997, the U.S. Fish and Wildlife Service (Service) has reviewed the above-referenced document. In addition, Service staff have met with Bureau of Land Management (Bureau) staff on two occasions. The proposed standards and guidelines cover approximately 4.2 million acres of public rangelands in California. The proposed standards and guidelines are designed to promote the ecological functions and processes necessary to maintain and improve rangeland conditions, including habitat for listed, proposed, and candidate species pursuant to the Endangered Species Act of 1973, as amended. The Bureau proposes to initiate consultation at the activity level when actions needed to achieve the stated conservation objectives are specified for each allotment. It is at this level that potential adverse effects to species may occur.

Based upon Service review of the DEIS and discussions with Bureau staff, we have determined that consultation is not necessary at this time. Informal consultation and formal consultation, if needed, can be conducted at the activity level as proposed.

If you have questions or require further information, please contact Cay Goude or Peter Cross of my staff at (916) 979-2725.

David L. Harbor
for Wayne S. White

cc: AES, Portland, OR

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Southwest Region
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TEL (310) 980-4000; FAX (310) 980-4018

JAN 29 1998

F/SWO31:DRR

Ed Haste
State Director
Bureau of Land Management
California State Office
2135 Butano Drive
Sacramento, California 95825-0451

Dear Mr. Haste:

The National Marine Fisheries Service (NMFS) has reviewed the Bureau of Land Management's (BLM) Rangeland Health Standards and Guidelines for California and Northwestern Nevada Draft Environmental Impact Statement (DEIS) (August 22, 1997, letter and enclosed DEIS from E. Haste, BLM, to W. Hogarth, NMFS). The proposed standards and guidelines are designed to promote ecological functions and processes to maintain and improve rangeland conditions, including associated habitat for listed, proposed, and candidate anadromous fish species consistent with the Endangered Species Act of 1973 (ESA), as amended.

The BLM proposes to initiate ESA section 7 consultation at the activity level when these range management actions may affect listed and proposed anadromous fish species. Pursuant to this strategy, NMFS and BLM staff have met several times and discussed details of individual grazing programs within the range of anadromous fish in California. Based upon staff discussions and review of the DEIS, we have determined that consultation on these standards and guidelines is not necessary at this time. The NMFS will continue to informally and formally consult on grazing actions at the activity level as appropriate.

If you have any questions, please contact Alice Berg of my staff at (707) 441-3533.

Sincerely,

William T. Hogarth, Ph.D.
Acting Regional Administrator

cc: Ed Lorentzen
Paul Roush



SF 85.35 .C2 R363 1998
Rangeland health standards
and guidelines for

